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Mitsubishi joins the PCMs

A THIRD Japanese company, Mitsubishi Electric, is to follow Fujitsu and Hitachi into the IBM plug-compatible mainframe business.

Beyond the announcement that investment in development would amount to $108 million, and that first deliveries were planned for 1983, no further word was available from the company. But Japanese observers believe that Mitsubishi Electric, part of the giant Mitsubishi trading group, wants to gain IBM plug-compatible experience so as to be on an equal footing with its two partners in the VLSI development project, Fujitsu and Hitachi.

Companies in the Mitsubishi group account for about 7% of Japan's gross national product, and together represent IBM's biggest single customer base in Japan. They use comparatively few of Mitsubishi's own computers, and Mitsubishi is expected to begin marketing Fujitsu's M-series machines to these companies as an interim step towards introducing its own compatible range.

Mitsubishi's current line is built in partnership with Oki Electric and is called the Cosmo series. It is an original design incompatible with any US series and in power covers the low and mid-range IBM 370s.

The VLSI project to develop the next generation of computer microcircuits is being pursued by a company formed jointly by Fujitsu, Hitachi and Mitsubishi and is paralleled by a similar project from NEC and Toshiba. The project has run about three years and will take another two.

Meanwhile Siemens and Fujitsu have formally signed their exchange agreement under which Siemens will market Fujitsu M-18011 and M-200 mainframes in Europe and Fujitsu will take Siemens peripherals.

NEWS IN BRIEF

German watch on privacy

A GROUP of workers in the computer business in Germany has founded the German Association for Data Protection, feeling that newly-enacted legislation there is not sufficient to ensure that citizens are aware of their rights and the potential dangers of data abuse. Professor Hans Bull, commissioner for data protection, has welcomed the members of the association as allies.

In the UK, Home Secretary Merlyn Rees has announced that the report of the Data Protection Committee will be published during Parliament's summer recess — before November.

Microgen takeover

A MAJORITY shareholding in computer output on microfilm bureau, Microgen, has been taken by Barbour Index. The three executive directors of Microgen, Douglas Lee, chairman, Alan Bratchell, sales director, and Jim Crossland, production director, remain in their current capacities, and are joined by Patrick Barbour, Richard Baker and Peter Bates of Barbour Index on the Microgen board. Bates becomes managing director of Microgen.

More wheels

NEW printwheels for European languages have been introduced by Qume for its daisy-wheel word processing printers, containing all the required letters and accents for Sweden and Finland combined, Denmark and Norway combined, France, Switzerland, Italy, Netherlands and Spain. Typestyles available are Pica and Prestige Elite. In the UK, these are supplied by Facit.

And another.....

YET another company, Nanodata of Williamsville, New York, plans to introduce IBM-compatible processors. Nanodata's line will match the 370/138, 148 and 158.

Also on the IBM-compatible front, National-CSS has taken delivery of its first V32 processor from Philips subsidiary Two Pi. The V32 is a bit-slice micro-based 32-bit minicomputer with the IBM 370 instruction set, marketed by National CSS as the 3200 with proprietary software. Yale University is said to be interested in the machine to run the National-CSS Nomad relational database.

Addison Schumann Celone

Itel appoints three European vice-presidents

A SUBSIDIARY in Israel has been set up by Itel International and David Addison has been appointed vice-president of marketing and operations to supervise UK, Scandinavian and Netherlands subsidiaries as well as the new company in Israel.

The general managers of the four companies will report to Addison, who until now has been general manager of Itel UK and Itel Scandinavia.

As yet no one has been named to take over Addison's former position.

The Israel company is based at Tel Aviv and will market the complete Itel International range of products and services including the Advanced System series of IBM compatible processors.

Another major new appointment announced by Itel International is that of Nino Celone to vice-president of systems marketing and support. His responsibilities will include liaising with the product development section of Itel in the US to ensure that new products are suitable for the European market.

A third Itel International man to be made a vice-president is the European field engineering boss, Herwald Schumann.

Government urged to ban sales to Russia, South Africa

PRESSURE is building up on the government to classify computers as strategic material, like arms, thereby inhibiting their sale to such countries as South Africa and the Soviet Union.

The US already does not allow the sale of computers to South African military or police forces, and has recently blocked the Univac machine for Tass, and there have been calls to prevent ICL filling the gap.

President Carter last week asked the UK, France, Germany, and Japan to co-operate in his ban of a sale to the Soviet news agency in retaliation for the jailing of dissidents (CW, August 3). The Foreign Office said that it had "taken note" of the request but as no British company had yet applied for an export licence for such a sale, it was "hypothetical" to discuss whether it would be granted.

The French government, however, stated flatly that it would not co-operate with President Carter, saying, "It is not French practice to subordinate the sale of civilian industrial material to political considerations."

Reports that Tass had approached ICL for a replacement for the banned Univac 1100 were described by the company as "not correct."

"No formal approach has been made," said a spokesman, adding, however, that ICL's sales staff in Moscow would have been in conversation with Soviet officials "in the normal course of events."

Regarding South Africa, the Anti-Apartheid Movement has asked Foreign Secretary Dr David Owen to stop all sales of British computers to South Africa. ICL has had considerable success there since the US decided to include computers for "military or police entities" in its interpretation of the United Nations voluntary arms embargo, and it has transpired that one ICL machine is being used by a military aircraft maker.

A junior minister at the Department of Trade and Industry said that in the light of this, UK policy on computers for South Africa might have to be reviewed.

London bus DP link-up likely

A PLAN to use computers to monitor and control the movement of its bus fleet is being considered by London Transport.

If approved by the GLC, the computer-based communications system will come into operation in the early 1980s and utilise coded radio transmissions between bus and computer that give special control centres an up-to-date picture of how each service is running.

If there are too many or too few buses on the roads, bus terminals can be informed and the required adjustment in bus numbers made. Drivers can also be told to cut their journeys short if required.

NPL installation

THE logging and reduction of experimental data are the main applications for a GEC 4070 system installed at the National Physical Laboratory at Teddington, Middlesex. The 4070 is linked to terminals located around NPL via the laboratory's internal packet switched network.

CII-HB offers Swift interface for Level 6

LOOKING to expand its business with European banks, CII-Honeywell Bull has written software which enables the Level 6 minicomputer to be used as an interface to the Swift interbank currency transfers network.

According to the company, the package is designed to allow other applications to run on the minicomputer concurrently with Swift. Although it was developed in France, it has as yet been announced only in West Germany.

Principal contenders for the Swift interface market are the three approved suppliers — Burroughs, General Automation and ICL, formerly Singer — plus IBM, which has one solution based on the System 7 process control computer and another which runs on a 370 mainframe; and Arbat, the London systems house which specialises in banking systems based on Digital Equipment PDP-11 minis.

A solution based on the IBM Series 1 mini is due from BIS Software (CW, June 1).

Banking on DEC

BANKING systems specialist house Arbat has placed an order for a Digital Equipment PDP-11/60, bringing its total orders for this model alone to over £650,000. The first seven units are in operation in UK and European banks, and Arbat expects to have the remainder installed in the next three months.

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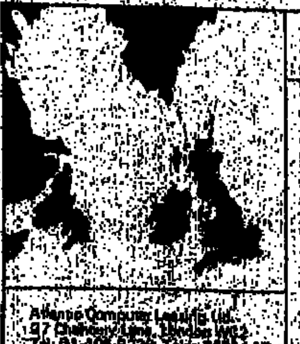

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IBM prepares for E Series and Orbit

HERALDING the arrival of its new E Series line of smaller mainframes, IBM is expected to start an "autumn sale" by cutting purchase prices of some of its smaller 370 models by 20% to 30%. And the company has aligned itself with President Carter's fight against inflation by committing itself to keep salary increases of its 170,000 US staff below the level of the past two years and to keep overall price rises below 4% in the US.

The recent restructuring of IBM's mainframe DP division (CW, August 17) was a prelude to the announcement of the E and larger H Series.

A major announcement from IBM is expected in mid-September which industry observers believe could be the introduction of price cuts on the 370/115, 125, 138 and 148 and/or the announcement of the Orbit 32-bit mini distributed processing system (CW, June 8) or the E Series itself.

According to the distinguished industry commentator, Bob Fertig, of Applied Computing Techniques in New York, the price decreases on the smaller 370 mainframes would, if they occur, cause many rental or lease users to convert to purchase, reducing the inventory of returned machines which IBM will face following introduction of the E Series.

The E Series will succeed the 115 through to the 148.

From the IBM users' point of view, the most welcome product announcement would be Orbit, which will be a much more powerful and flexible alternative to the 3790 communications processor in SNA networks. The same basic processor architecture is expected by some IBM watchers to be used in the E Series CPUs.

The pledge on US prices and salaries was contained in a letter from IBM chairman Frank Cary to Robert Strauss, President Carter's inflation counsellor, who described it as "highly gratifying."

UK salary policies are unlikely to be affected by the pledge. Pricing policies are generally fairly closely tied to those in the US, but current market conditions and cost trends are likely to preclude any major hardware price increases.

Commenting on the restruc-

● Turn to page 2

Briefing

NEB extends range

THE NEB is extending its computer involvement to include typesetting and word processing. It has taken a joint stake with Barclays Bank of £3½ million each in Monotype, the printing equipment company, which is working on an advanced computerised laser typesetter. Monotype also markets the Quill word processor and has bought City Computer Systems which specialises in mini-based financial systems and was formerly owned by Monotype's new chairman, Dr Peter White.

The NEB is also looking at ways of marketing electronic systems, possibly with Logica, in which it recently acquired a stake (CW, July 6).

Inmos talks fail

FOLLOWING the collapse of talks between Inmos and Mostek aimed at settling the dispute over trade secrets between the two companies (CW, August 10) a new hearing of Mostek's application for an injunction has been set for September 7 in Dallas. The injunction is aimed at preventing former Mostek employees now with Inmos from using trade secrets.

User workshop

A PRACTICAL workshop aimed at helping DP departments to improve relations with their users is to be run on October 17 by the Institute of Data Processing Management and Computer Weekly. Full details page

Tandy launch

A NEW small business system based on the Computer Automation 4/10 computer is to be introduced on to the US market shortly by Tandy. Known as the Tandy 150, it will be sold through a new chain of stores the company is setting up called Radio Shack Computer Centres. The move follows the takeover last month of Tandy Computers, which was formed last year to sell Computer Automation hardware, as well as the TRS-80 microcomputer (CW October 27, 1977).

Missile system

A CONTRACT WORTH £1.4 million to develop and install a computer system for real time analysis of missile firing trials carried out at the Royal Aircraft Establishment Aberporth test range, has been won by Ferranti. Based on a Ferranti FM 1600 computer, the system is to allow continued safe testing of missiles while oil exploration takes place in the area.

Police information

LARGE-scale information system for the Metropolitan Police, based on a CTL Series ... ordered two years ago, is in the final stages of ... The CTL multi... system (CW, Dec 9 ...) ... and is ex... data on crime, ... associates.

NEW headquarters of the British Computer Society in Mansfield Street, London, is to be formally opened by the society's patron, the Duke of Kent, on Wednesday, October 4. After considerable difficulties because of the lack of telephones when the staff first moved in last month, the society is now settling into its new home. The building is listed as of architectural importance and in an endeavour to restore it to its former glory, which could cost up to £50,000, the Society has appealed to computer companies for support to help defray this extra cost. BCS president Professor Paul Samet told Computer Weekly that there had been a good response with some very generous donations. Anyone who wishes to contribute to the restoration should contact Julian Bogard, treasurer and chairman of the Establishment Committee.

Robots, ham radios and energy in Philly

A ROBOT developed by a 16-year-old boy, micros linked via ham radios and a home energy control system, were among the most startling exhibits at the Personal Computer Show which opened in Philadelphia last week.

The robot is based on a KIM 1 micro. It is called Mike and its inventor Ted Loosdurrow, has already written a book on robots.

Two Minnesota men, Jim Fox and Roy Dunbar, furthered the cause of cheap computer communications by linking Intel 8080s over 200 miles via ham radio. They have now been assigned by the Radio Amateur Satellite Corporation in the US as the principal control and command station for the Amsat project to put a satellite into orbit with a 16K micro on board.

A doll's house model controlled by an Apple 2 system is being used by Home Computer Centre Inc to demonstrate a natural energy control system for the home that has already been installed in a house in Virginia. The actual control system is based on a Motorola 6800 micro which monitors the temperature in the water tank, controls the pumps and decides when to use and when to store energy. It is said to be able to cut heating bills in half.

As at the National Computing Conference in Anaheim (CW, June 8) it was the offering from individuals which caught the eye more than those from the established companies.

Neddy £30,000 grant for computer manpower study

THE manpower needs of the computer industry are receiving increased interest from the government, in the shape of studies by both the Manpower Services Commission and the National Economic Development Council. The Computers Sector Working Party of Neddy has just announced the award of a £30,000 grant for a study to be carried out by the Institute of Manpower Studies together with the Science Policy Research Unit of the University of Sussex. It is intended to go into the likely changes in the industry over the next decade in considerable depth, in order that it may be more reliable than simple extrapolations of today's figures. This will enable the SWP to assess needs for education and training.

The Manpower Services Commission, as part of a wide-ranging look at different occupations for its "Training for Skills" programme, has been looking at the computer industry and particularly at the services business. It has recently opened discussions with the Computing Services Association, and the CSA for its part is carrying out a survey of its members on training needs. It will make a submission on this by the end of the year.

Alan Benjamin, CSA director-general, emphasised that it was the needs of staff at entry level that the association is at present interested in — training rather than education. But he wants discussions on what courses in polytechnics and universities would be relevant to young people interested in entering the industry.

The Neddy study is intended to establish what staff will be required by the mid-1980s by computer manufacturers, users, and service companies, and what types and levels of skills will they need.

In a separate announcement, the government has said it is setting up a study under the chairmanship of an under-secretary in the DES to find ways of extending and improving on-the-job training for 16 to 18 year-olds. In many occupations there are few opportunities for continued vocational training and to find ways of improving this the study group will be talking to the TUC, the CBI, and other interested organisations.

Dispute shuts UCC centre

THE protracted dispute which paralysed Irish telecommunications has forced the University Computing Company international bureau network to close its Shannon data centre, which it opened in 1966 as its first venture in Eire. Work will be transferred to UCC's three other centres in the republic but a company spokesman said that the Shannon closure was the first step in UCC retrenchment in Ireland.

Court pledge on 'confidential information'

TEMPORARY undertakings not to use confidential information gained while employed by Philips Data Systems were given in the High Court last week by three former employees who had set up a rival computer company.

The three men, William Mark Gascoigne, William Pitt, and Kenneth Foster, against whom Philips has taken action to stop alleged misuse of confidential information and breach of their employment contracts, have undertaken not to approach

● Turn to page 16

COMPUTER WEEKLY'S INSIDE NEWS

IMPACT WEEK
A theme running through this week's issue is the growing awareness of the wide ranging impact of computers on society, as highlighted by Lord Avebury, David Cockroft, and Christopher Hodder-Williams.

AVEBURY DOWN UNDER
Speaking at the Australian Computer Society conference, Lord Avebury has called for the establishment of an international centre to study the impact of information technology on society. Page 5

UNION MICRO THREAT
Continuing our series of articles from leading union representatives on the way in which the micro is likely to affect patterns of employment, David Cockroft, head of research for the APEX white collar union asks whether the micro could kill unions. Page 4

TOMORROW'S CHILDREN
Futureview returns with an interview with one of Britain's most versatile authors dealing with the impact of technology, Christopher Hodder-Williams. His vision of the future provides an original perception on the nature of tomorrow's world. Pages 12/13

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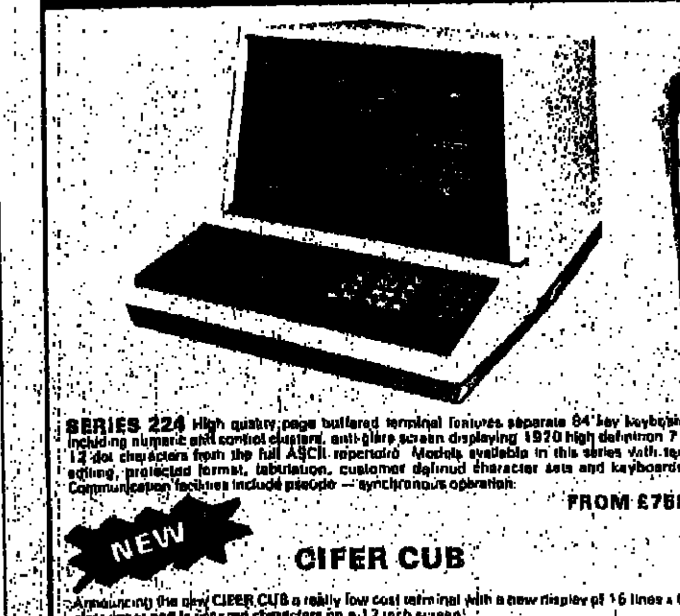

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Lighthill years behind the times

THE Science Research Council is considering a proposal for investing £10 million in robotics research (CW, August 24) and the Department of Industry is providing a small grant to the British Robot Association; and the BRA is planning a trip to Japan to study Japanese advances on the subject (see page 3). And so Britain begins to catch up with yesterday.

In our rapidly changing technological environment, however, the name of the game is being one step ahead of others; of looking clearly towards the future. There can be no doubt any more that artificial intelligence, robotics, expert systems or whatever it is called, will be of great significance in the future.

It is also an area that relies primarily on the one scarce resource, in which Britain is among the world leaders, human intelligence and ingenuity.

But if one wants to find examples of recent major advances in the machine intelligence area, one usually has to go to the US or, in particularly advanced automation projects, to Japan. If our research institutions had been more perceptive in the past, however, Britain could have been up among the front runners.

In July 1972 a remarkable report on Artificial Intelligence was prepared for the SRC by Sir James Lighthill, Lucasian Professor of Applied Mathematics at Cambridge University. It was a confused, ill-researched document which, by adopting a negative approach to likely developments in AI, particularly in the "building of robots," effectively set back British research into the subject for a considerable time.

As shown in an SRC pamphlet published in 1973, many experts argued with the report's essential message that there had been disappointing results in all aspects of AI and that, in robot building in particular, there was little likelihood of progress in the future.

The definition of "robot building" in the report was extremely vague. Yet the effect of the report was to spread a cold blanket across a wide cross-section of AI activities.

The perceptiveness of the report can be highlighted by a remarkable suggestion that building robots might be regarded as compensation for their male inventors' inability to give birth to children.

The report is, of course, history. But it contains a vital lesson for the present and the future.

At this crucial point in technological development, Britain must back systems, ideas and people who can increase the country's standing in those areas that are most important to our industrial, economic and intellectual future. This backing will, at times, involve a strong element of financial risk, but it will often be relatively trivial.

A group of computer scientists has, for example, put forward a proposal to the SRC for the establishment of a knowledge refining centre (CW, March 9) which could study and develop the emerging "expert systems." At most, this venture would cost a couple of million pounds.

The current SRC robotics proposals, the NEB Inmos venture, the DoI micro plans — all these show that, at last, there is a new mood of intelligent, realistic appraisal of the technological road to tomorrow.

And now that we have caught up with yesterday, perhaps the future can begin.

FOCUS

Keeping standards in their place

AT a recent seminar on computing standards, those taking part included the National Computing Centre, the Institut de Recherche d'Informatique et d'Automatique/Bureau d'Orientation de la Normalisation en Informatique and the Gesellschaft fur Mathematik und Datenverarbeitung.

Perhaps the first item on the next international gathering should be the standardisation of names.

The desire for imposing industry standards on all concerned seems rather hard to understand — and even harder to impose.

What may be standard attitudes, for example, in banking may well be irrelevant in more commercial installations, such as manufacturing or wholesaling.

While banks may have the resources and time to invoke high level standards, other installations are far more down-to-earth. In many cases, the objective is to achieve results despite all known (and many unknown) adversities.

Standard features include impossible workloads, turn-round times and equipment. In such cases the only standards imposed by the DP teams are those of crossing fingers and hoping for the best.

That the standards committee are often out of touch can be assumed by their membership. The UK delegation to the seminar, for instance, included such standard industry representatives as the NCC (4) nationalised industries, banks and sundry government bodies. Almost, perhaps as an afterthought, one delegate from the IDPM was invited to represent the practical world of data processing.

The end message of this particular session was that "Standards were vital to computing: computing is vital to the community; therefore computing standards are vital to the community." Perhaps the message got lost in the translation.

The meeting also agreed that society could not return to manual methods. For this reprieve the industry is presumably duly grateful.

Standards, as is a well-known fact of DP life, should be kept in their place. This place is all too often the action pending tray of the DPM.

In the meantime, logging procedures will go by the installation board in the face of a combined assault from JCL errors, grotty tape decks, demanding workflows and sundry bugs of the unidentified kind.

Similarly, with the entire computer installation being held in pause mode while awaiting an on-site running repair to the application program, standards could well be relegated to a later date.

Not all in the DP industry share the enthusiasm of the NCC in respect of standards. All too often standards imply not only conformity but inflexibility — both undesirable DP objectives. Achieving the impossible is seldom the result of sticking to rules and procedures.

According to the ever-fascinating Computer Weekly feature, "Ten Years Ago," topics featured in 1968 were mainly concerned with technological discovery—IBM experimenting with word processing systems and Honeywell with small, laser beam memory units.

It has taken 10 years for these projects to turn into reality.

On that basis, today's standard discussions could well see light of day in 1988. By which time a lot of data will have flowed round the standard barriers.

INTERRUPT

IT was Christmas Eve, and the ICT (as it then was) Nebula Compiler team had just finished their well-earned Christmas lunch. The Nebula Compiler was large, and to assist in its development, the team had built in the most comprehensive diagnostic system imaginable. Consequently, every test run that failed produced sheet upon sheet of detailed monitoring and post-mortem analysis.

As high quality (sic) waste, one year's output of used line printer paper had fetched a good price and had enabled the team to dine well at the local Berni. Replete and seated in the bar for the regulation glass of coffee, the team noticed a stranger approach the barmaid.

"ICT?" she asked him politely.

The stranger visibly recoiled. "N-no!" he gasped. "Hot coffee, please."

The moral: Don't use confusing identifiers.

● Submitted by M. J. Pickett of Twyford, Berks, who wins this week's £5 prize.

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300 in Computastars finals

THE finals of the Computastars competition will be the athletic event of the year for many computer people. Over 300 competitors are now preparing for the day, Saturday, September 30, at London's Crystal Palace sports complex, and there are going to be plenty of supporters to cheer them on.

Tickets are still available, and where block bookings are made in advance seats will also be allocated for team members so that they may join their friends between events.

Tickets cost 50p for adults and 20p for children and each ensures a numbered seat

To round off the day there is to be a disco for all competitors and their partners.

Computastars has been organised by Goldsmith Recruitment International with the support of Computer Weekly.

IBM prepares for E Series

● From front page

turing of research, development and manufacturing in IBM's mainframe DP division. Fertig notes that each of the two new divisions has its own microcode, systems software and programming groups, which he interprets as a sign that there will be a greater interlocking of hardware, firmware and software functions in future products.

Fertig also speculates on reasons for some of the movements of personnel within the DP division. T. C. Papes formerly head of the development and manufacturing side of DP, has been appointed vice-president for business plans. Fertig believes that Papes may have been held responsible for IBM's apparent unreadiness for the enormous demand created by introduction of the 3030 series.

He estimates the order backlog worldwide for these machines at between 12,000 and 14,000, and believes that between now and 1981, *IBM will* only be able to ship between 3,500 and 4,000 of the machines.

This active marketing life of the 3030 series has been determined by comparing lease and purchase prices for the machines.

Ten years ago...

COMPUTER WEEKLY — AUGUST 29, 1968

THE first 360 system in the UK to be equipped with IBM's magnetic tape data preparation equipment had been ordered by the London-based Turegum Insurance Co . . . Terminal equipment built to use the British standard interface and designed for small users was introduced by ICL . . . A suite of programs for the computer-aided design of buildings for earthquake zones had been developed by the London-based consulting engineers, Alan Grant and Partners

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IBM association may open the door to plug compatible users

IBM Computer Users Association is conducting a survey into its terms of membership, which might open the way for users with plug compatible processors, from suppliers like Itel and Amdahl, to join the association. At present, the IBM CUA conditions of membership exclude the plug compatible processor user although they do allow for users who have a mix of IBM and plug compatible processors.

Led by CUA deputy chairman, Graham James of Empire Stores, a commission will carry out a fact finding operation from which a resolution will be drawn up for the CUA annual meeting next April. The resolution could alter the CUA constitution in a way that will enable plug compatible users to stay in the association.

Two such users have already been affected by the existing CUA terms of membership. Teamco, the London bureau that has replaced its 370/155 with an Itel AS/5, has been told that the CUA cannot accept its application for membership, and an existing CUA member which has also gone over to Itel has been informed that its membership might not be renewed when it expires at the end of the year.

But the position of both these users could change after the April annual meeting if members of the association vote in favour of changing the constitution.

James told Computer Weekly that the whole question of plug compatible machine users is being looked into now to avoid problems in the future.

Factors that will be considered in drawing up a resolution to change the constitution include the likelihood that many users of plug compatible processors will retain their IBM peripheral equipment. This could include kit like disc controllers incorporating processors that could be regarded as IBM computers in their own right.

The existing CUA constitution offers membership to big users of IBM-based bureau services, and the commission will have to look into the position of a client of a bureau with IBM compatible machines.

One problem that could be encountered is the client not being able to tell if he was using IBM machines or plug compatible processors if the bureau had both.

One other major IBM user group, Guide, has made it clear that it will not allow plug compatible processor users that do not have an IBM machine, to retain their membership of the group.

Japanese invest £40m in semicons

THE Japanese semiconductor industry is spending over £40 million this year to expand production facilities in its attempt to take a major share of the growing semiconductor business.

Fujitsu, which entered the business only last year, and is already first to market with a sample 64K random access memory chip, is currently spending over £10 million on a new manufacturing plant. Much of the money will be for automated production equipment, and electron-beam exposure systems are expected to be installed soon.

Nippon Electric (NEC), already Japan's top IC producer, is planning to spend over £20 million on its semiconductor division, with about 90% of that going to automated production equipment.

Toshiba, though still to spend heavily, plans investment of about £10 million this year. It is the only Japanese company not expanding its semiconductor investment programme; in 1976 it spent some £25 million. This reduction in spending has been caused by the semiconductor division turning in a loss last year.

Robotics study tour to Japan next year

IN an attempt to close the gap in robotics technology between the UK and Japan, the British Robot Association has arranged for a two-weeks study tour to Japan next year.

Working in co-operation with the Japan Industrial Robot Association, the tour will visit 13 companies that either make or employ robots. It will be restricted to 25 participants, to allow the maximum time for discussion.

At a recent meeting of the association to discuss the Department of Industry's report on what UK manufacturing practice should look like 10 years from now, it was indicated that the technological gap between the UK and its most important rivals in robotics is now at least 10 years.

There was some feeling at the meeting, however, that the gap could be considered as 10 light years in terms of the effort required to bridge this technology gap.

The dates for the tour have been set as May 27 to June 10, 1979, and the approximate cost will be £1,350 including all air travel and hotels.

The association has received an initial grant from the Department of Industry of £15,000, spread over two years. It will now become the centre of all industrial robot activities and information in the UK.

CIS Cobol interface kit

MICROCOMPUTER OEMs producing Intel 8080 or Z80-based systems can now interface the Micro Focus CIS Cobol software package into their systems themselves, following the introduction of an interface kit by the company.

Previously, the task of adapting the package to different hardware configurations had to be undertaken by Micro Focus.

The interface kit, which comes in the form of the CIS Cobol compiler and the run-time system in object code form, means that OEMs are required only to write two small program modules — one to interface with the existing operating system, and one to drive the video display.

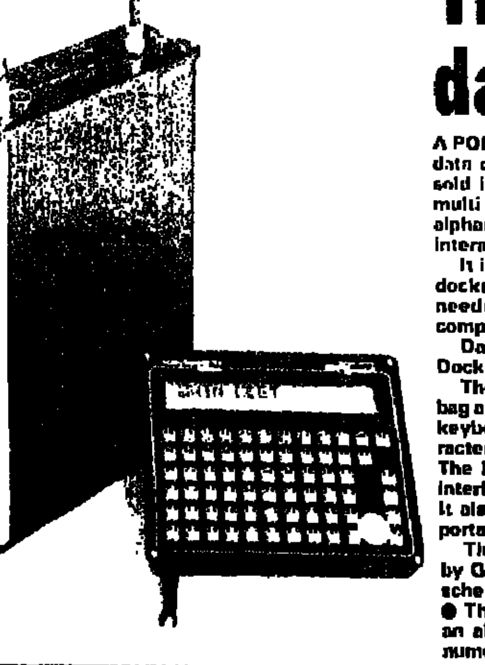
This is possible because the CIS Cobol compiler is itself written in an optimised sub-set of the language, and runs under the same run-time system as applications programs.

Once the run-time system is interfaced with the existing operating system, the CIS Cobol compiler becomes resident on the system.

● One of the first customers for the CIS Cobol interface kit, together with the language, is Wavemate in America.

Alan Wood joins Micro Focus

HARD on the heels of the formation of his own company Digitus (CW, July 20), ex-director of Data Logic, Alan Wood, has also become a partner in microcomputer software specialists Micro Focus. As part of his business trip to the Far East and the US, he is now seeking to complete OEM dealerships and manufacturer implementations for the Micro Focus ANSI standard interactive CIS/Cobol package which is available for the Intel 8080 and the Zilog Z80 versions.



Transmitting data by radio

A PORTABLE data collection unit that can transmit data directly to a computer by radio is now being sold in the UK by Westrex. Called the Data Geet multi mobile system, it comes with a hand-held alphanumeric keyboard/display and can be used to interact with a computer up to 1,500 metres away.

It is particularly aimed at applications, such as in docks, airports and warehouses where a person needs to be in direct two-way contact with a computer.

Data Geet systems are already used in Hamburg Docks for transport and container control.

The radio transceiver unit comes in a shoulder bag and weighs about 6½ lbs. Data captured by the keyboard is recorded in blocks of 64 7-bit characters and radioed to a base station at 1,000 bps. The base station then relays the data via a V24 interface to the host computer at up to 4,800 baud. It also relays data from the computer back to the portable terminal.

The Data Geet was developed in West Germany by Geet, Gesellschaft für Elektrische & Elektronische Technik mbH, of Hamburg.

● The Data Geet transceiver unit is available with an alphanumeric keyboard board (left) or with a numeric only keyboard.

S. Africa: Unions meet ICL staff

A MEETING of AUEW/Tass representatives and staff members from ICL's West Gorton, Manchester factory was held earlier this week to discuss possible action to be taken over the proposed sale of an ICL 2972 to the South African police (CW, August 10). The machine would be built at West Gorton and ICL personnel are worried about the effect of the sale and the ethical issues it raises.

Tim Webb, national officer for ASTMS, has asked for a meeting with ICL managing director Dr Chris Wilson to review the situation.

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The Energy Show has expanded into a larger hall in the National Exhibition Centre complex.

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DOWNTIME

by Chad

Put in the picture...

ADVERTISING brochures for conferences and seminars often carry pictures of people looking suitably studious. I sometimes wonder who the people are. Is there among them a future Tom Watson? A future Jim Callaghan? A future Groucho Marx? A past Malcolm Peltu?

When our editor, the present Malcolm Peltu, received a brochure for a forthcoming Infotech workshop, there on the cover was a picture of himself, together with consultants Alan Sutcliffe and Ian Hugo.

Alas, none of these gentlemen will be imparting their wisdom at this particular workshop. The brochure, naturally enough, can contain only pictures of previous affairs — the ghosts of workshops past — but it does prompt me to wonder if the great Saatchi and Saatchi Dole Queue controversy has gone upmarket?

Words to the wise

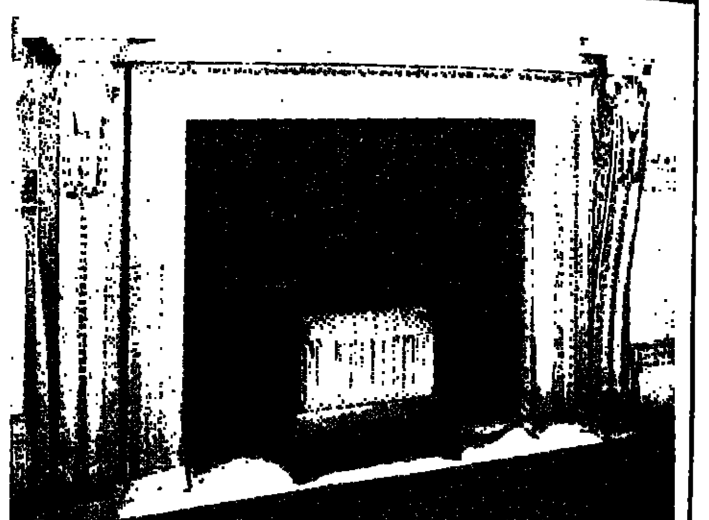
THE other day I overheard just a snatch of a colleague's telephone conversation, and was struck by the fact that I could tell instantly that he was talking to a telephone answering service. Why do you suppose we use a completely different tone of voice when talking to a machine from that we use when talking to a human being? Will this still be the case, I wonder, when we all have hot and cold running robots to answer our every whim?

The man-machine conversations in the film 2001 were quite natural, of course, but you and I know that the computer's lines were spoken by a fully paid-up member of Actors' Equity, as were those of the robots in Star Wars.

It's interesting that while, traditionally, imitations are artificial, nowadays so many simulated mechanical things are in fact human. It is not all that new, however: in the last century there were several fraudulent chess-playing machines going the rounds of the fairs which had very small grand masters inside. But I digress.

And why shouldn't I, say I? Talking of chess machines, there have been reports of a mysterious portable computer being used by Korchnoi at the Chess Follies in the Philippines. All we know about it is that it is nicknamed "Tolinka", is British, weighs 33lb and has broken down.

Now, where was I? Oh yes, talking to machines. It must be related to the way we talk to babies. I think I'll apply for an SSRC grant to study it.



AMATEUR detectives among you can do the BCS a great service by keeping your eyes open for this genuine Adam fireplace, which was stolen from the society's new headquarters just as they were moving in (CW, August 10). I gather a replica is being made in fibreglass, but the return of the original marble one would be much appreciated. (NB: You are *not* looking for the gas fire in the middle, antique though it may appear.)

How micros could change the role of the unions

By David Cockcroft

THE discussion in the columns of Computer Weekly about technology and jobs is taking place at an opportune moment. The seemingly overnight conversion of the government to the cause of the UK microelectronics industry and the beginning of serious consideration of the economic and social impact of microprocessor based equipment have made the subject front page news. At the heart of the public debate, which is likely to intensify, is the argument between the "futurists" who see a radical transformation of society, and the cynics who have seen it all before.

I come down on the side of the futurists. Even British manufacturing companies, frequently ill-informed, ill-advised and steeped in 200 years of conservatism, will not be in a position to resist the international competition which is being generated in almost every sector of manufacturing and private services by the rapid drop in the price of general purpose programmable ICs. The argument about who will make the first commercially viable 64K RAM may well be important, but it is not half as important as how we handle the application of microprocessors to products and processes.

Microprocessors are changing the face of computing. Because of their cost and flexibility they are rapidly reducing the threshold price of DP systems, enabling smaller companies to take advantage of data processing for the first time. The development of standardised software for microprocessors, at the same time, is reducing the need for highly skilled software specialists at the user end. Since the pressure for innovation and product development so often comes from the smaller firms with fewer vested interests in the status quo than the giants, this will make change much more likely.

Indeed, the areas for microprocessor application range far wider than data processing as it is currently understood, into word processing, electronic mail, electronic funds transfer and, of course, automation of manual jobs. Most of the technology exists already. The only variable is the cost element, and the cost trends are so clearly visible as to make possible "concrete" predictions about the next five to 10 years.

Unions like APEX, with a long established interest in the computer industry, are monitoring these developments closely. Even unions without a DP base cannot afford to ignore microelectronic technology. Many union members work in offices, and if word processing has the impact which some people forecast, it will fundamentally affect the number and nature of their jobs.

APEX has already set up a working party to look at word processing: to assess what the impact on jobs will be and to look at other aspects such as the effect of VDUs on health and safety. For our members, word processing may well be the most important application of microelectronics: there are estimated to be about 7,000 word processing units installed in the UK, and sales of around 2,000 to 3,000 are expected in 1978.

But word processing is only one area, and we cannot shut our eyes to others just because our members are not so directly affected. The automation of manual jobs is an issue which is frequently scoffed at, and indeed there is no doubt that cheap microprocessors cannot eliminate the need for expensive robotic and mechanical control equipment. But microprocessors can, unlike existing computer controlled systems, be adapted to discrete functions within manufacturing without the need for massive investment in new capital equipment. More accurate control of machinery may lead to de-skilling of manual jobs and the ability of microelectronic control systems to reduce the need for maintenance work with fewer breakdowns and by introducing automatic diagnosis into the system, has similar implications.

The increasing complexity of chips and the resulting decrease in their numbers and connections will accelerate this trend. Automation of mechanical handling devices and their connection with microcomputers handling stock control and electronic funds transfer may have equally serious consequences for workers in distributive trades. Electronic funds transfer will be an important element in banking, insurance and finance.

What should unions' reactions be to all this? One common attitude, reflected in recent articles in the Morning Star is to look on the microprocessor as the "job killer". Echoing this view recently was the comment by a member of one specialist union, that microelectronics would mean "the end of the union". Both attitudes have an element of truth. Microelectronics is bound to "kill" some jobs, and reduce the traditional bases of some trade unions. It could cause massive unemployment, and estimates of two, three or even four million unemployed have been made.

Even the DP industry itself may not escape unscathed. The implication of the widespread installation of microcomputer systems in large numbers by traditional users of mainframe systems, and the replacement of house software capability with bought-in but modifiable software packages could reduce the demand for certain types of DP personnel.

On the other hand, to look at microelectronic technology in terms of job losses is like viewing the invention of the wheel in terms of an increase in road accidents. Many people do dull, boring, degrading and often physically tiring jobs and most people spend the larger part of their waking existence either at, or travelling to or from work. The extension of intelligent control devices in a flexible way could make many jobs easier and enable us to produce more goods with fewer man hours. Viewed this way the "microprocessor revolution" could be an enormous benefit to society.

The question which will determine whether it is a triumph or a disaster is that of distribution: distribution of wealth and distribution of employment. Will the installation of microprocessors on a large scale mean a small elite of highly paid, highly skilled employees, a larger number of unskilled unmotivated workers doing menial jobs which cannot be automated and a pool of embittered unemployed people with no prospects of employment?

If it does, the result will be chaos, and if society does eventually adjust to a more equal distribution, it will only be at the expense of stability and possibly democracy itself. The alternative is to start estimating our future labour requirements and the extent of training and retraining necessary now.

We must begin to plan for expansion in the new product areas which microelectronics will make possible, including home computing and home information technology, to plan for the sustained expansion of personal social services, health care and other aspects of public service which are essentially person to person based, and to plan a better distribution of work over the population as a whole by shorter working weeks, longer holidays, earlier retirement and sabbatical periods linked to training and education.

Few trade unionists or workers of any description will be immune from the impact of microelectronics. That is why APEX believes that a response should come through the TUC itself. We have proposed a working party from all interested unions to start this work. Of course, government studies like the Think Tank and ACARD exercises that have now begun within the Department of Employment will clearly cover a lot of the ground, as will thinking by the computer and semiconductor manufacturers, and we would expect the TUC group to be in touch with them.

But the need for facts to be gathered by the trade union movement itself will be obvious. Facts take on different shapes depending on the angle from which they are studied and trade unionists usually take a different approach to companies, manufacturers or government department.

Unions in other countries are already engaged on similar exercises and it would be a pity if in this, as with so many other things in the past, Britain was slow to take the plunge.

At the TUC Congress next month the impact of information technology, particularly the microprocessor, is to be raised by a number of unions (CW, August 10) and last week Tim Webb — national organiser for the white collar union ASTMS (CW, August 24) — called for government action in a number of areas relating to the introduction of technology, including a suggestion that new technologies should not be implemented without union agreement.

In this article, David Cockcroft, head of research at another white collar union — the Association of Professional, Executive, Clerical and Computer Staffs (Apex) — explains why he believes the UK must take a positive approach in planning to make the most of the opportunities offered by the micro and to alleviate some of the areas of potential social disruption.

Cockroft Photo: Lawrence Spartham (IFL).

This is the latest in a continuing series of articles in Computer Weekly about the impact of information technology.

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NEWS IN BRIEF

Capital boost for SEMS

THE French part-public venture capital organisation IDI, Industrial Development Institute, has subscribed almost 10 million francs for new shares in leading European minimaker SEMS.

SEMS' capital has been increased from 80 to 110 million francs, and each of its other shareholders also have put up money for some of the new shares.

As a result of the transactions, IDI now has 9% of SEMS, while Télémécanique's share falls from 25% to 24% and that of Cogis from 75% to 67%. Cogis is a holding company owned 55% by Thomson, 29% by CGE, 14% by Schneider and 2% by Mines Kali Ste Thérèse, all companies which were shareholders in the former CII.

Move into UK

THE timesharing company CSS International has set up a professional services department in the UK, following the success of a similar operation in the US. The team, initially comprising three analyst/programmers, will offer services ranging from consultancy, systems analysis and design, and programming, through to training and documentation.

2903 for Trinidad

TO establish a database on the oil industry in Trinidad, for the Ministry of Petroleum and Mines, an ICL 2903 has been ordered by international petroleum consultants Gaffney, Cline and Associates. The 2903, which is to be installed at Port of Spain, will supplement an IBM 1130 dealing with data on the oilfields.

Chinese training

CHINESE programmers and technicians from the Hangchow turbine factory have been undergoing training with Siemens in Germany under a collaboration agreement between the factory and Siemens' turbine subsidiary Turbinwerk Wesel. The Hangchow factory, 50 miles south of Shanghai, is to get a Siemens computer for automating production at the plant.

NEB share

THE investment of £1.17 million by the National Enterprise Board in Negretti and Zambra (CW, July 27), makers of precision instrument and process control equipment, has been approved overwhelmingly by shareholders. The deal, which gives the NEB a 30% share in the company, is to finance the development of the distributed process control system, MPC 80.

Coventry's plans

PLANS are being considered by Coventry City Council to replace its ICL System 4/72 with a more modern machine. Although no definite choice of a successor has been made, councillors have agreed to allocate 0.75 million of the council's budget to purchase the system.

Calculator

A LOW-COST electronic calculator, called the TI-31, has been introduced by Texas Instruments. It offers a range of financial and statistical functions, and at £16.95 each, its cost is comparable to that a general purpose machine. One of its eight special keys allows the user to carry out "what if?" type calculations through preprogrammed functions.

White House date

[illegible] of the organisations in [illegible] take part in the White [illegible] Conference on Small [illegible] is the US [illegible] of Data Processing [illegible]

British Aerospace to install a 2960

THE design and development centre of British Aerospace at Wharton, Lancashire, is installing an ICL 2960 in its flight test department. The ICL machine will take over work now handled by twin Xerox Sigma 5 systems.

ICL says that the British Aerospace decision to order the 2960 was influenced by the facilities offered by the 2900 IDMS database management system.

The 2960 configuration, valued at £1 million, will include 2½ Megabytes of main memory and six EDS 200 disc stores and will run under the VME/B operating system.

Wharton is the UK design, development and manufacturing centre for the Jaguar and Tornado aircraft used by air forces in the UK, France, Germany and Italy.

Centre for informatics and society urged

An international centre to study the effects of information technology on society, and to disseminate information about this to the world's decision makers, should be set up, according to Lord Avebury, chairman of Digico and former Liberal MP. Such a centre, he says, is essential in order that knowledge about these important effects can be compiled continuously, rather than in fits and starts, as with the ad hoc studies currently being carried out.

Lord Avebury was addressing the Eighth Australian Computer Society Conference in Canberra on "The impact of computers on society seen from the Western viewpoint."

Referring to current studies such as that of the UK Think Tank, he said. "The trouble with these exercises is that within a very short time they are out of date, and even while they are in progress they do not involve the trade unions, the professions and the social scientists, whose need to understand and interpret the developments concerned for the public at large may be as great as the politicians'.

"What is required," he continued, "is some means whereby the informatics community would continuously update decision makers about their technical capabilities, while at the same time there could be a dialogue on the social effects." His proposed International Centre for Informatics and Society could be set up under the auspices of the Organisation for Economic Co-operation and Development.

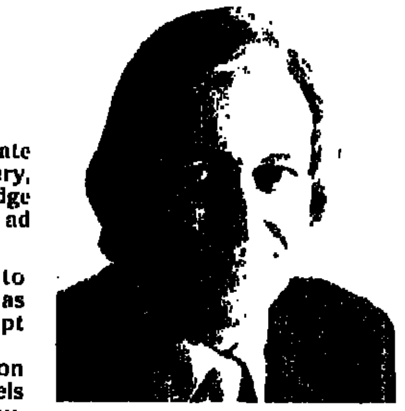
As an example of ignorance and uncertainty about computers, Lord Avebury quoted an observation of the Younger Committee on privacy: "Of all the forms of invasion of privacy which have been cited in evidence to us, that involving the use or misuse of computers has been the least supported in concrete terms."

In discussing various specific effects of computers, Lord Avebury pointed out that other technology has been the cause of rising unemployment much more than computers, yet "computers are being cast as the villains of the piece."

But regarding employment, he added, "We tend to speak about the introduction of information processing technology in a way that misleads the public into thinking there is some choice as to whether or not we adopt them."

He cast considerable doubt on the validity of computer models on such things as the economy. Describing some trials with the Treasury model to see what would happen if all wage controls were removed, Lord Avebury expressed surprise at the model's conclusion that there would be very little effect on inflation, and asked, "Is the computer better than our intuition?"

On the study of computing in UK schools, Lord Avebury declared; "The educational system ought to concentrate on the application of computing, rather than its science."



LORD AVEBURY . . . computers are being cast as the villains of the piece.

Qume offers new style daisy wheel terminal

A DAISY-WHEEL printing terminal, the Sprint 5, has been introduced in the US by Qume Corp of Hayward, California.

The product, which represents the company's first significant diversification away from OEM daisy-wheel printers used by the majority of the world's word processor manufacturers, will be introduced throughout Europe next month by Qume's distributor, Facit of Sweden.

The Sprint 5, which is driven by a Fairchild F8 microprocessor with a 224 character buffer, is the first in a line of printer terminals planned by Qume. It transmits and receives at up to 1,200 bits per second, and is available in keyboard send-receive and receive-only versions. Versions running at 55 and 45 chps are available.

Applications for the Sprint 5 are primarily in the small business area where users such as solicitors, accountants, banks and so forth require at least one better-quality terminal attached to their computer.

It can also be used as a remote printer to a word processing system, and features a graphics capability. It allows horizontal increments of 1/120th of an inch and vertical increments of 1/48th, and can plot up to 5,760 points per square inch. Two-colour ribbons in three different qualities are available, and over 50 different daisy-wheels, including all European languages and Arabic, are available.

Facit will exhibit the Sprint 5 at the Sicob exhibition in Paris next month.

'Rockwell into micros for cars market'

A PREDICTION that Rockwell International will move into the micros for cars market has been made by International Resource Development, a research firm based at New Canaan, Connecticut.

The prediction is made in the latest report from the company in a series called Directions Intelligence, each report of which looks at the present activities and future interests of a major company. To make the move into micros for cars, the report speculates, Rockwell will make major acquisitions.

Other new products forecast by the report are a computer output microfilm system, a general purpose optical character reader and a voice identification system. Though much of Rockwell's efforts will be aimed at internal use, outside sales of components should have an effect on the company's earnings by the 1980s.

Operating system

AN OPERATING system for 8080 and Z-80 based microcomputers has been introduced into this country by literature supplier, LP Enterprises.

Futuredata support

AN early entry into the market for hardware and software support systems for Intel's 8086, 16-bit microprocessor has come from Futuredata, which has introduced an 8080/8085 to 8086 translator utility for its standard systems software.

This will run on the standard Futuredata range of Microsystem universal development systems, which are already capable of supporting Motorola's 6802 and 6800, and Zilog's Z80.

The 8086 utility permits direct assembly language conversions to be carried out, with source programs written in 8080/8085 assembly code being translated directly into 8086 code.

Data Logic reorganisation

THE resources of Data Logic and Raytheon Cossor Data Systems are to be merged into a single company, following the acquisition of Data Logic by Cossor Electronics earlier this year (CW, January 5).

At the same time, the sale of word processing systems is to be added to the existing business of the two firms.

The new group, which will trade under the name Data Logic, comes into operation on September 1 with five constituent divisions. These are: Terminal systems, formerly RCDS; professional services, formerly Data Logic; communications products; word processing; and customer engineering.

The word processing division will market the Lexitron range of stand-alone systems, together with allied Lexington equipment for typesetting. Cossor's US parent, Raytheon, took over Lexitron in the US at about the same time that Cossor acquired Data Logic.

Communications products to be marketed include the Intertel range of modems and network controllers, together with new micro-based channel controllers and line conditioning equipment, still under development by Data Logic.

The new group, with a staff of about 500, is aiming at a turnover of around £15 million in 1979. Professional Services division, operating as Data Logic, had a turnover in the six months ending June 30 of about £2 million.

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For the full story contact Stratford Safe Co. Ltd., Borehamwood, Hertfordshire or ring U.K. Sales 01-353 9433/4311.

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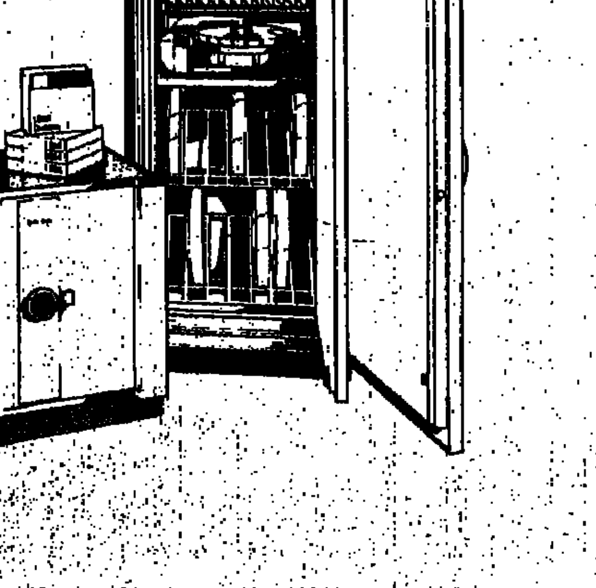
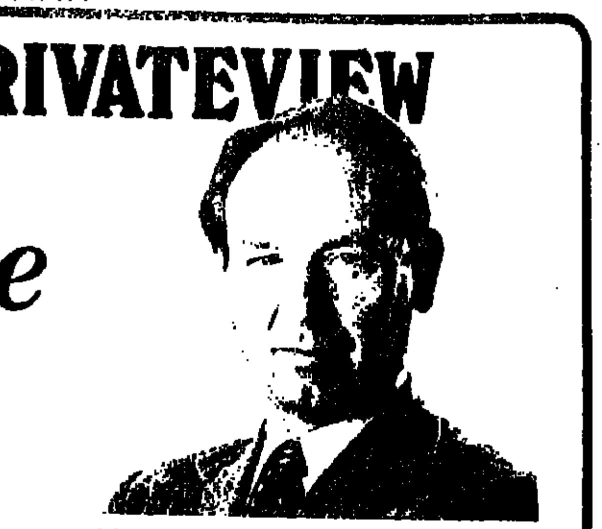


MICHIE'S PRIVATEVIEW



Cognitive horizons

TODAY I shall stretch the horizons of the mind to the year 2001 AD, and discern there the outline of what I shall term the "Cognitive City."

Computer networking in 1978 has already added receptor and effector organs to the major control institutions of cities, not just the Town Hall but the medical organisation, the educational system, the banks, the airlines, road traffic control, building and planning authorities and so on. These networks are beginning to talk to each other, at present for simple pragmatic reasons. It is helpful when reserving an air ticket if the system can interrogate your bank for credit worthiness. It is helpful if the police, seeking a man with a recent finger amputation, can get into the hospital records of the relevant city. But I shall skirt around the privacy issue, a red herring in my present context.

Now extrapolate to the year 2001. Imagine that the city administration network and the medical network and the news media network and the police network and the bank network and the traffic control network now have considerable intelligence incorporated into them. Imagine also that each is communicating quite richly and densely with the other networks.

Imagine, finally, an eventual situation in which there is a control network for an entire city, with its own goal-setting, in which nobody can be found any more, who can understand even the documentation, let alone the system itself, certainly not the megasystem, but only one little pathway through the huge jungle.

Great confidence will then be required that the megasystem's heuristics and inference procedures and evaluation functions are tuned just right, because a cognitive city will have to do the normal kind of administrative trading with other cognitive cities. If we are serious about the trend towards universal administration by computer, then we must envisage trading and bargaining by computer, and bargaining depends critically upon the perception of values.

What if no-one can any more say what the system's values are now, nor even how they are arrived at and updated? Such a situation is already with us in microcosm when the performance-at-all-costs style of programming is allowed to have its head in a complex domain. According to testimony of the authors themselves, no-one now knows what is inside the evaluation functions of the world's two leading chess programs.

In the most pessimistic scenario, the years following 2001 AD will see homo sapiens as a parasitic species. Uncomprehending humans will live in the interstices of automated cities, like fleas on the backs of dogs.

I do not myself believe, as some do, that the dogs will one day ask the fleas "What have you done for us lately?" and that we shall then become a superseded species. People have more sense than to drift so far in such a direction. Further, if we invest in really intensive study of the human interface, and of the programming methodologies for giving our new problem solving partners a human face, then the issue "Servant or Master" need never arise.

Let me answer those who may find the notion of a system's "human face" vague or obscure or otherwise unhelpful, by stating more precisely than I have done in earlier Privateviews the distinguishing features of "expert systems," since these exemplify precisely the methodologies which I am commending.

An expert system is a machine embodiment of some branch of human expertise, not only by the criterion that it can answer questions reliably in the relevant problem solving area ("What is wrong with this patient?" "Would this be a good spot to drill a well?" "Are there precedents for this application of patent law?" "What is the best move in this chess position?" "What is the likely molecular structure of this compound?" "What would be a good way to synthesise insulin?" "Who killed the sheriff?") but also by the criterion that the system represents the problem domain in something like the conceptual terms used by the human expert.

The key consequence of adopting a human style of knowledge representation is then capable also of answering, in ways which make sense to the human user, questions of the quite different form: "How did you work that out?"

A strong insurance policy for society's future would be the most active possible development of expert systems work. But the primary motivation should be not so much the automation of expertise in itself as the insight to be gained into design principles for the conceptual interface between man and machine.

Such insurance will depend on society at large gaining an understanding of the nature and motivation of machine intelligence work, to replace the Frankenstein-like or childlike images which have so often been projected upon us in the past.

Computer sales up 24%, says DoI

AN INCREASE of nearly 24% in total sales by UK computer equipment manufacturers between the first quarters of 1977 and 1978 is shown in the latest set of Business Monitor statistics from the Department of Industry.

The Monitor contains two tables of export figures for the four quarters of 1977. One contains the figures provided by manufacturers, the method used till now by DoI, and the other is made up from overseas trade statistics gathered by HM Customs and Excise.

The Customs statistics will be used from now on in the Business Monitors rather than manufacturers' export figures, and they add up to much higher total export values mainly because they show much higher figures for exports of parts.

For example, the parts figure for the fourth quarter of 1977 collected from manufacturers was less than £5.5 million, while the figures obtained from the overseas statistics was well over £42 million.

The overseas trade statistics show that total exports in the first quarter of 1978, at £106 million, were actually slightly lower than in the first quarter of 1977 and well down on the fourth quarter 1977 figure of nearly £134 million.

Imports of computer equipment, the figures for which have always been based on overseas trade statistics, were nearly £189 million in the first quarter of 1978 compared with less than £165 million in the first quarter of 1977, an increase of well over 14%.

Xerox likely to start winter auto office offensive

THE growing competitive activity in the automated office market is likely to be further speeded up with three major announcements of facsimile equipment from Xerox over the next six months.

Xerox is also one of three companies which is on the verge of introducing another important advance in this market, the intelligent copier (CW, August 24).

The prediction about the facsimile announcements from Xerox is made by leading US electronic mail expert Howard Anderson, president of the Yankee Group of Cambridge, Massachusetts writing in the quarterly report on electronic mail*.

Anderson says Xerox will announce a desk-top, two-minute facsimile unit within the next three months, priced at about $90 per month. Also, within the next three months, Anderson predicts Xerox will introduce a sub-minute analogue unit, priced in the range of $350 per month.

The third announcement predicted by Anderson is an intercity store and forward facsimile to facsimile or facsimile to laser printer service. The reasons behind these announcements, he contends, is that "Xerox is getting clobbered at every angle" in the facsimile market.

"There are currently some 275 Xerox facsimile salesmen, all of whom are fighting a rear-guard action," Anderson claims. "Xerox has not given them the products they need to be competitive. With the two new facs models, they will be competitive.

Anderson says that Xerox itself is not certain if it will enter the intercity message service business. He notes, however, that the company has hired Richard Wiley, former chairman of the US Federal Communications Commission, to inquire of the FCC whether Xerox would be required to register as a common carrier if it were to offer such a service.

"There is also some question as to whether this service would be from customer premises to customer premises, from customer premises to Xerox office, from Xerox office to customer premises, or from Xerox office to Xerox office."

He notes that Xerox currently offers a facsimile service from Xerox office to Xerox office, although it is not considered a "carrier service" because the customer only rents time on the Xerox telecopier by the minute.

Anderson claims that it is common knowledge that Xerox is building an advanced communications network, although company officials decline to comment on that rumour.

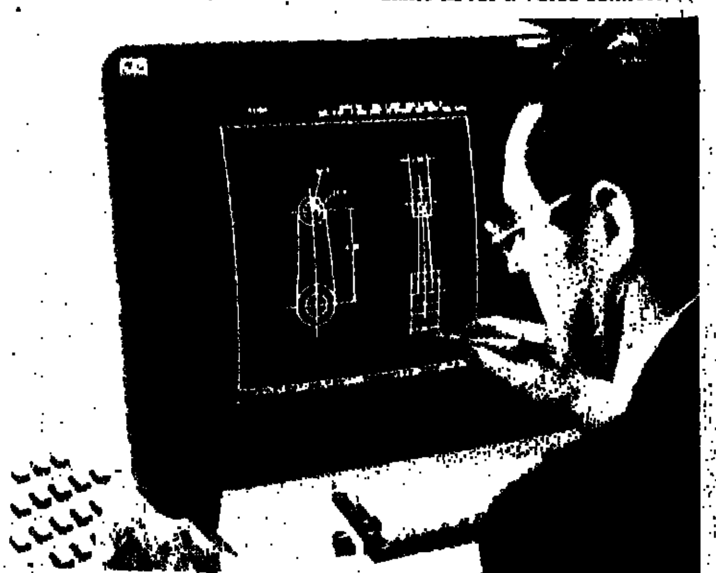
"It is our opinion that Xerox plans offering such a service for facsimile and message switching and that this may be announced within the next six months."

*The electronic mail report. $475 which includes four quarterly updates. The Yankee Group, Harvard Square, PO Box 43, Cambridge, Massachusetts, 02138, USA.

Italy links up to Datel 2400

ITALY has become the eleventh country that can be reached on Post Office Datel 2400 using direct dialling.

The 2400 bps half duplex service is based on Modem 12, which has been in use since last year on the Datel 2412 inland service. Previously the highest data rate public service to Italy was 1,200 bps on International Datel 600. The cost of a call is the same as for a voice connection.



Design drafting and analysis are two of the main facilities provided by Cadam, a computer aided design and manufacturing system now available to users of the IBM 3250 interactive graphic display system, shown here. Cadam, which can support multiple display consoles, was developed in the US by Lockheed Corp and is offered by IBM as an Installed User Program. It comprises nine different user-selectable modules, and another of its important features is numerical control parts programming with output on paper tape.

Puzzler

AN American reader has sent in the following variation on the hallowed "Dear Dad, please SEND + MORE = MONEY" theme. This transatlantic version reads "Hi Pop, please

WIRE
MORE+
MONEY

See page 37 for solution.

Problems face realisation of US digital phone network

THE realisation of an integrated digital telephone network will be more difficult in the US, according to a report, The digital future of the telephone network.*

This the report blames on the conflicting policies of AT&T and the impact of various developments from its Bell Telephones subsidiary. It also assesses the role of optical fibres and the Advanced Communications Service.

*The digital future of the telephone network. 144pp. $150. Probe Research Inc, PO Box 251, Millburn, New Jersey, 07041, USA.

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PROGRAMMER NOTES

More communications with operating staff needed

MARK TWAIN once remarked that everyone talks about the weather but no-one ever does anything about it.

Similarly, in the DP industry we realise that the relationships between operations and programming staff is poor and often strained but no action is taken to rectify the situation.

Operators tend to think of programmers as people who submit work in the wrong job classes and with incomplete documentation. Programmers are also guilty of submitting too much testing work and thereby ruining any chance they may have of finishing early on the night shift.

For their part, the programmers seem to think of operations staff as some sort of computer room Mafia, who specialise in floor-sorting card decks and returning incomplete output.

What to do? Obviously, we must make each aware of the other's difficulties.

So, there must be more communication between the two sections with a view to giving them an insight into the others problems. Regular meetings could usefully be arranged for they have much to learn from each other.

In a lighter vein, operator Sid Bryce tells us about a ritual which sometimes takes place at his Exeter University site.

He begins: "Being an educational establishment, it is inevitable that at various times of the year hordes of sticky-fingered school-kids (and undergraduates) are given a guided tour of the computer room.

They are shown around by a programmer: "The programmer invariably wants to see action — all the tape decks whirring away, the graph plotters describing intricate geometric patterns, and the card readers banging themselves to death. At this point at least one of the operators is performing like a seal for his amused but uncomprehending audience."

The operators have a solution: "We invite the programmer to mount a tape (*of course*, we choose the *faultiest deck*) and he makes a hash of it."

Enter the operator: "At this point, you casually walk over to the deck and relieve his embarrassment under the admiring gaze of the adolescent school girls present."

Everbody is happy: "They are impressed, the programmer is happy; and you have won the respect you have so long desired. If by a fluke he manages to mount the tape successfully you have lost nothing — just saved yourself a job."

SOFTWARE FILE

EDITED BY PETER HEWITT

Mini manufacturers shy of Pascal commitment

WITH news of three further minicomputer implementations, Pascal is now close to being available on all major minicomputers. In addition to the compiler under development for GEC's 4000 Series (CW, August 24) Pascal software has been produced in the US for the SEL range and for Data General Eclipse and Nova machines.

Manufacturers, however, continue to hold back from a commitment to the language, still largely the preserve of academic institutions and individual enthusiasts. GEC, in developing its own Pascal software, has become one of the very few manufacturers to do so.

A GEC spokesman, who noted that quite a number of academic customers had shown an interest in Pascal, said that the software would nonetheless be suitable for real time industrial applications as well as educational use.

With the project still at an early stage, however, the company was reluctant to discuss in detail its commercial intentions for the product.

There is as yet no national or international standard for Pascal, apart from Professor Wirth's official definition of the language. However the GEC team is in close contact with the British Standards Institute working group on the language, so that the company's implementation is likely to be closely in line with the draft BSI standard currently being planned.

The spokesman noted that the implementation would support independent compilation of Pascal procedures, in effect permitting modular programming. A special effort was also going into the development of diagnostic aids such as debugging tools.

A feature under consideration, he added, was the ability to mix Fortran and Pascal routines. Present in many implementations, this would allow Pascal programs to call subroutines from existing Fortran libraries, such as the NAG library, and to use established graphical packages, such as Gino.

A Pascal compiler for SEL's 32-bit minicomputer has been developed by a Californian software house, California Software Products Inc of Santa Ana.

The software runs under SEL's RTM 6.0 operating system, generating directly executable code which is re-entrant and shareable.

It supports calls to Fortran and Assembler subroutines and offers I/O facilities for handling disc files, tape files, and printers.

An SEL spokesman said that the company is considering taking up the UK agency for the product, which sells in the US for $10,000. It would be offered in the UK for around the same price, he said, with SEL providing first-level support.

The Data General implementation runs under RDOS on Nova or Eclipse systems with at least 32K bytes of memory. Produced by Rhintek Inc of Columbia, Maryland, it is a seven pass compiler, itself written in Pascal.

The software generates intermediate code for a hypothetical "stack" machine, which is interpreted at run-time by a program written in Nova assembler. A single user licence to the compiler is sold in the US for $975.

A second Pascal option for Data General Eclipse users comes from Medical Data Consultants of San Bernardino, California. Also interpretative, the software represents an intermediate step in the company's development of a fast-executing Pascal compiler.

It is available on 800 bpi nine-track tape for a reproduction cost of $100.

ADR takeover talks could enhance products range

THE US software company Applied Data Research will be adding both DBMS and TP software to its product range if negotiations currently under way are successful.

At the same time, the planned acquisition neatly illustrates recent suggestions that many computer industry firms are ripe for takeover.

ADR, best known for its software products such as Librarian and Roscoe, is planning to acquire both Insyte Datacom Corp and Insyte Applications Corp, according to a joint announcement by the two companies.

The takeover would give ADR rights to a variety of IBM 360/370 compatible products, including Datacom/DB — a DBMS based on inverted file structures — and Datacom/DC, a multi-tasking communications control system.

The Insyte product line also includes a data dictionary system, a data entry subsystem, Datacom/DB query facilities, and a Datacom/DB report writer based on Computer Associates' CA-Earl software.

The move follows closely on a report by International Data Corp which suggested that many computer industry firms could be considered potential targets for acquisition.

The report, Computer Industry Acquisitions, the result of a multi-client study, noted that more than 300 firms have already been acquired, 38% of them software and services companies.

It went on to forecast that IBM, Digital Equipment, Hewlett-Packard and Texas Instruments could join Honeywell, CDC, Univac, Xerox and Data General on the takeover trail.

In addition to reviewing details of both completed deals and those which were terminated, the report contains a separate section profiling more than 400 potential targets and a further 100 potential acquirers.

Price Commission: some comfort for CICS users

ALTHOUGH the Price Commission upheld IBM's increase in charges for older versions of CICS (CW, Aug 17), users in the UK will not after all be paying any more for the software.

The increased rental, which customers have been paying since January, should never have been charged by the company, said an IBM spokesman this week.

Billings will revert to the old level in September, he added, and refunds will be made as soon as possible to those who have been paying the additional 20%.

IBM notified customers on June 27 last year of price rises for certain software products, giving — as is its standard practice — six months' notice of the increases. The company however excluded some products, notably those receiving C class support, on condition that it had identified them by July 1.

According to the IBM spokesman, a letter was subsequently sent — dated June 29 — specifically exempting CICS/OS Standard, CICS/DOS Entry, and CICS/DOS standard.

By some error, the increased charges were nevertheless put into effect on January 1, he said, and neither the company nor its customers had until now detected the mistake.

Incompleteness mars two NCC books

TELEPROCESSING monitors for IBM 370[1] and ICL 2903/2904[2] systems are the subject of two new publications from the National Computing Centre.

Both survey the principal packages available and aim to guide two main categories of user: those selecting such software either for the first time or as a replacement, and first time computer users of those evaluating a replacement system.

Each book begins with a useful survey of the basic hardware and software provided by the manufacturer, setting the scene for the role of the TP monitor.

Subsequent chapters discuss each package under a standard set of evaluation headings.

Although attractive in format and clear in content, these books suffer from two serious faults.

The first is incompleteness. The IBM 370 survey — while including MTCS, CICS and four proprietary packages — inexplicably ignored the Westinghouse product, Westi, and the three Informatics packages, Mini-comm, Intercomm, and Datacomm.

Although said to be up to date at the time of going to press — ... 1978 — the ICL survey ... acknowledges the ... of Zeus Hermes' on ... of Cortez. Cortez ... September 22, 1977) ... no mention of the entry-level Cadiz system (CW, February 23, 1978) — surely of relevance to first-time TP users.

The other chief failing relates to the level of treatment. Explicitly aimed at an audience including first-time computer users, both books refer without explanation to multi-threading while still on the first page.

[1] Teleprocessing monitor packages for IBM 370s, by David Hebditch. 89pp. £15. NCC Publications, Oxford Road, Manchester, M1 7ED.

[2] Teleprocessing monitor packages for ICL 2903/04s, by G. B. Bleazard. 55pp. £10. NCC Publications, Oxford Road, Manchester, M1 7ED.

Coral 66 manual

A CORAL 66 programming manual* has been published by the National Computing Centre. The book, the first official reference work on the use of the language, describes the basic features and facilities of Coral and its application to real time computing.

Complementing the official definition, published by HMSO, it contains practical examples of Coral programs and a discussion of good programming practice, in addition to providing a basic introduction to the language.

*Coral 66 Programming, by J. T. Webb. 110pp. £5. National Computing Centre, Ashford Road, Manchester, M1 7ED. Tel: 061-228 6333.

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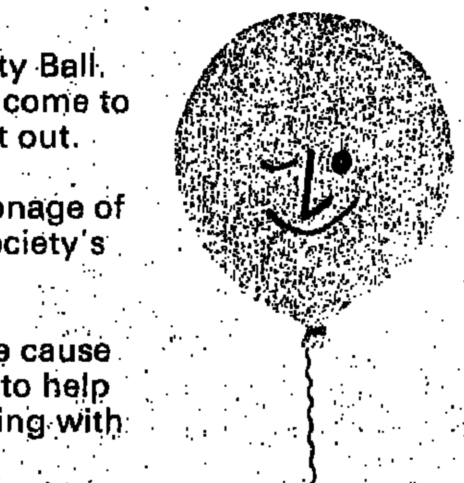

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OP SPOT — **By Bernard Allen**

Continuing his series of site visits, Bernard Allen has been to W. H. Smith's installation at Swindon. He describes life in an installation comprising three different ICL systems; the nature of the work, experience and training to be gained, and facilities available to staff.

Wide experience at Swindon site

FIRST impressions are lasting impressions, or so they say.

But that is not always the case, and it certainly does not apply to my visit to the computer room at the Swindon installation of W. H. Smith.

At first glance, as you enter the room, all that is apparent is a vast collection of storage units, peripherals and consoles. It is hard to make it all out or see the plan of the place.

However, a closer, more considered examination reveals a clear pattern of operation and three ICL systems emerge: a dual-processor 2970 with five Megabytes of storage and running under VME/B; a 1904S, under George 3; and a 2960, under DME/George 3.

Three shifts are employed at the site. Each comprises two shift leaders and seven others who are either operators or senior operators.

The members of each shift are deployed in a logical manner; three are dedicated to the operation of the 2970 and the other six work on a rota basis between the other two systems.

There is a pleasant, relaxed atmosphere about the place and, judging by the knowledge the staff showed of all three machines, it was evident that a certain amount of flexibility is used in the operation of the systems. A good example is the manner in which Pepi Galatti, the 2970 shift leader, was able to compare the 1904S with the 2960.

Said Galatti, "Although both systems run under George 3, the 2960 has facilities which make things easier for the operators. Everyone here prefers it to the 1904S."

The 2960 has VDUs, of which Galatti said, "They are very useful when you are searching for information because it is possible to page backwards and forwards. To get similar information from the 1904S teletype console you have to search through the log, and that takes much longer."

At the 2960 console were Kevin Weaver, an operator who has been with the company for 18 months and Paul Pugh, a freelance operator who is on a six-month contract at the site. They confirmed what Galatti had said about the two systems.

Said Pugh, "As you can see, the system has two VDUs, which is good because one is dedicated to the system operator work and the other to the peripherals."

Weaver also spoke in praise of the 2960, particularly the speed with which it processes work and reacts to the operator's commands.

But let's not forget the 1904S which resides inconspicuously behind some control units, and beside the magnetic tape library. Andy Downes, a senior operator, was on duty at the system's teletype console.

He agreed about the superiority of the 2960 but pointed out that the 1904S has Geronimo, an operating aid which uses auxiliary consoles to "take pressure off the main console."

Of course, the star turn is the 2970 with its dual processor and five Megabytes of main storage. Curiously, the system's VDUs display white characters on a dark background (as opposed to the green characters of the 2960), of which senior operator Cedric Purnell said: "The white characters are a bit hard on the eyes at times, but apart from that I like the system very much."

It was Pepi Galatti who described some of the features of the VME/B operating system, including the Operator Communications File, of which he said:

"The OCF is good because it records any errors which occur on the discs, tapes, printers and communications network. We find it particularly helpful where the tapes and printers are concerned."

But it is fair to say that the site has experienced considerable problems since it became the first to install a 2970 back in October 1975. Galatti had some interesting things to say about this, in relation to both hardware and software.

"One day the system is fine, but the next it just goes down. Software crashes pose few problems for us and we usually have the system up and running again in about five minutes. Hardware faults give us much greater trouble and on one occasion the system was down for about eight hours," said Galatti.

In the event of a hardware error, a report is made out and passed on to another section within the operations department which is headed by Technical Administrator Paul Butterworth. He has three technical officers, all ex-operators, under his control.

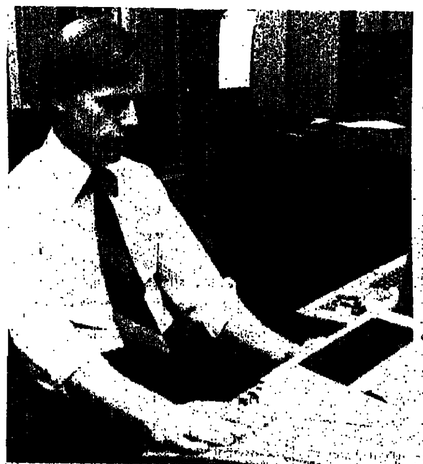
"Their knowledge is pooled, in effect, and I draw upon it as the need arises," he said.

In fact the section is also involved, to a certain extent, in the sorting out of software problems. As Butterworth puts it, "We hand those problems over to software support and then we follow their progress."

In the long term, the section is responsible for the specification, implementation and maintenance of the site's hardware.

Working hand in hand with software support, they have carried out a feasibility study into the switching of devices between the three systems.

"In the event of a failure, devices can be switched between the 1904S and 2960 because they both run under the George 3 operating system, and between the 2970 and the 2960 as they are both of the same series," he said.



Andy Downes . . . the 1904S has its good points, too.

Paul Pugh and Kevin Weaver, two of the operations staff who hold the ICL 2960 in high esteem.

The site uses over a ton of stationery each week and here senior operator Cedric Purnell takes a small fraction of that amount from one of the printers.

Formal and informal training

EXCELLENT rest room facilities, including a microwave oven and a place where food can be prepared, are provided for the operators at the Swindon site of W. H. Smith.

And it was in the comfort of the rest room that I spoke to Trevor Norton, who is the 2960 and 1904S shift leader on the same shift as Pepi Galatti. We discussed some of the broader matters relating to the installation.

According to Norton, the operators receive both formal and informal training. All have attended some of the courses run by ICL.

Much of their training is on an on-going basis, with the shift leaders playing a considerable role.

Said Norton, "The shift leaders have been tutored in training and supervisory skills, and since the beginning of the year we have been responsible for staff in this regard. We keep a list of all the technical matters the operators are to be trained on and we chart their progress."

All staff are given the opportunity to attend a first aid course, for which they receive the sum of £50.

"I didn't attend the course because it just didn't appeal to me. A lot of the others have, though," said Norton.

The site employs a card-key security system and all of the staff are given either one or two of the keys, depending on their role.

Explained Norton, "We have two sets, one which enables us to get into the building on the evening and night shifts and the other which works the device on the computer room door.

"The operators are given one of each because we work shifts, but the tape librarians only need those that get you into the computer room as they don't work shifts."

But surely security is largely a matter of attitude?

"Everyone is aware of the need for it," said Norton, "because it is better for us not to have people wandering about the computer room. A lot of it is common sense, really."

Playing a vital part in the business

THE computer operations department at the Swindon site plays a vital role in the affairs of W. H. Smith. The workload is made up of the following:

Around 30% relates directly to the warehouse on the premises which supplies books and other products to over 400 W. H. Smith branches throughout England and Wales. This is a batch system with certain online facilities under Driver. Each night a "picking list" is produced and given to the warehouse workers as a guide to the goods which are to be sent out.

The company's Books Club Association demands another 30% of the machine's time. The site produces all the output necessary for the Club's distribution centre which is also in the Swindon area and linked to the installation by RJE.

Around 20% is dedicated to supplying the company's wholesale houses in the South of England. The 30 in the South-Western region have dial-up facilities under Driver, but the South-Eastern region is wholly batch.

The remaining 20% includes an RJE link to another book organisation in Leicester, and some bureau time and development work. The programmers have online facilities supported by MAC and MOP.

According to David Gayler, computer services manager, over a ton of stationery is used each week. Microfiche output is also produced and sent to the company's branches.

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HINT OF THE WEEK

Using RETAIN keeps tape mounted, saves time

READING and writing multiple tape files in the IBM OS/VS environment is the topic of a hint sent by Sam Sexton of the operations support section at the Coventry site of Massey-Ferguson.

He says, "When coding your JCL deck, be sure to specify the RETAIN subparameter of the VOLUME parameter and use the PASS option for almost disposition, or DISP.

"This will keep the tape mounted and prevent it from being rewound after each file has been read or written, as the case may be. Thus a considerable amount of time is saved."

This is an excellent tip for, as Sexton points out, it prevents machine time being wasted.

For those who are new to OS/VS, some further explanation is needed:

The VOLUME parameter relates to the medium which, in this case, is a magnetic tape. By specifying the RETAIN subparameter, the JCL coder is telling the system to keep the tape mounted at the end of the job step.

The DISP parameter refers to the file. The PASS option instructs the system to make the file available to subsequent job steps, so that the tape will not rewind.

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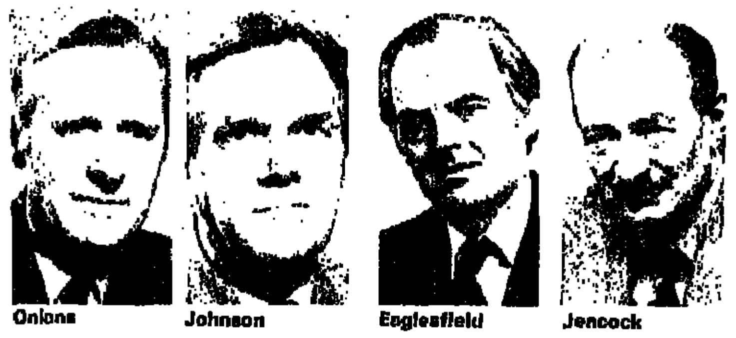
PEOPLE

Board appointments at Plessey Telecoms

IN the transmission division of Plessey Telecommunications at Beeston, Nottingham, two board appointments have been made. Frank Onlans has been made director and general manager of the division, and Frank Johnson has been named to the newly-created post of director of operations and deputy general manager.

Formerly director of strategic planning for Plessey Telecommunications International, Frank Onlans has worked for Plessey since 1965, holding appointments in Plessey Radar as manager of the equipment division and as marketing executive for the radar business.

After holding appointments as engineering manager and divisional manager with the transmission division, Frank Johnson became general manager of the division, the post he held before being appointed a director.



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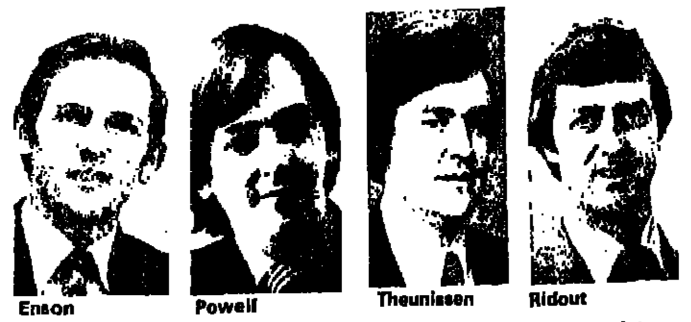

Enson Powell Theunissen Ridout

Norman Eason has been appointed manager of computers and automation at ERA, in succession to Michael Shortland who has left to become managing director designate of Fraser Nash Consultancy. Eason was previously manager of the computer-aided design department of ERA Power Engineering.

Tony Powell, previously in the Midland Bank's clearing operations department, has joined the Value division at RTZ Computer Services as a technical representative. Geoffrey Harris joins the Value division as a sales executive. Previously he ran his own OEM business.

Charles Jeacock, previously sales manager with Gemini, has joined Software Architects as sales manager in the South of England for the SAL contracts division.

Bob Englesfield has become marketing director of MDS Data Processing. He was previously director of European operations with Harris Composition Systems.

Jim Boxall, former director of computing services with Cheshire County Council, has moved to a similar appointment with Thomas Cook.

Michael Ridout has been appointed managing director of Braby Leskie's mechanical engineering division, following the death of Archie Atkinson. He remains MD of Auto Diesels Braby, a main board director and a Braby director. Steve Theunissen, formerly commercial director of Auto Diesels Braby, becomes director and general manager of the company.

Peter Cuthbert-Smith has become a director of Binder Hamlyn Fry. Previously he was a management consultant with Price Waterhouse's management consultancy group.

Keith Pursall of Systemsolve, formely in charge of systems and programming, has become production director. Derek Williams has been promoted from projects manager to Southern divisional manager. Peter Wemyss is now UK sales manager, Tony Duhig, was a senior consultant, has transferred to sales to become a territory manager in the South.

CONFERENCES

A CONFERENCE entitled Computer security and loss control, and aimed at executives and senior officials in data processing, finance and auditing, and others concerned with computer and information security, will take place at the Hyatt Regency Caspian Hotel, Chalus (Caspian Sea), Iran, on October 17-18. The organisers are SRI International (formerly the Stanford Research Institute). Further details from the Marketing Director, SRI-Europe and Middle East, NLA Tower, 12-16 Addiscombe Road, Croydon CR0 0XT, tel. 01-686 5555.

THE first 1978/9 meeting of the Computer Applications and Methods Group of the Institution of Civil Engineers will take place in two stages, beginning at 3.00 pm and continuing after a five-o'clock break. The subject of the meeting is Computer graphics in civil engineering. The other meetings in the 1978/9 session will be on December 11, Difficulties in interpretation of CP.110. February 19, Numerical methods in earthquake and dynamic design, and April 2, Computer networks. All meetings will be held at the Institution. For further information contact the Institution at Great George Street, London SW1P 3AA. Tel. 01-839 3611.

AN international exhibition of office equipment and electronic computers will be held in Cairo on October 4-14. Further information can be had from the General Organisation for International Exhibitions and Fairs, Guezira Fair Grounds, Cairo; Cable: Nefertiti, Cairo; Telex: 92600 Fair UN.

THE information management conference and exposition, Info 78, will be held at McCormick Place, Chicago, USA, on October 16-19. The conference sessions will be divided into three principal sections: information management, information technology and office automation. There will also be smaller groups of sessions on specific application areas. Details from the organisers, Clapp and Pollak Inc, 245 Park Avenue, New York, NY 10017.

SEPTEMBER 4-8
Medical Informatics Europe, congress. European Federation for Medical Computing. Cambridge.

SEPTEMBER 5-8
Compcon Fall 78. IEEE Computer Society, Washington, DC.

SEPTEMBER 7
People in computing, seminar. National Computing Centre. Riccarton Campus, Heriot-Watt University, Edinburgh.

SEPTEMBER 11-12
Non-invasive cardiovascular measurements conference. NASA/Stanford University, Stanford, California.

SEPTEMBER 12
Computer programs for project control, seminar. Association of Project Managers. Waldorf Hotel, London WC2. 10.00. Details APM, 01-799 3182.

Computers and the unions. Clive Jenkins. BCS 1978 Lecture Series, London School of Economics, London WC2. 19.30.

How do we use it? — how to monitor and control the day to day running of the system. Albert Stacey. BCS Group for New or Potential Users. Royal Angus Hotel, Birmingham. 14.00.

SEPTEMBER 12-14
Computers in cardiology conference. IEEE/Stanford University etc. Stanford, California.

SEPTEMBER 13
Meeting. CMC Users' Association (CUMAC). ITT Ltd, Saxon Motel, Harlow, Essex. 10.30. Details: Maidenhead 29525.

SEPTEMBER 13-15
Very Large Databases, conference. IEEE Computer Society/ACM/SMIS. Berlin.

SEPTEMBER 18-22
Jackson design technique, workshop. Marcus Bromberger. Dept of Computer Science, University of Strathclyde, Glasgow. 9.30. Details from the Continuing Education Office at the University, tel: 041-552 4400, ext 2132.

SEPTEMBER 19
Getting cost control accepted, seminar. Association of Project Managers/Association of Cost Engineers. Belfry Hotel, Manchester. Details: M. H. Drake, 061-228 2011.

Talk. Prof P. Samet. BCS Reading branch. Copper Inn, Pangbourne, Berks. 20.00.

SEPTEMBER 19-21
CAD/CAM, computer-aided design and manufacturing conference and exhibition. Computer and Automated Systems Association. Los Angeles.

SEPTEMBER 20
VME/K subgroup meeting. 2900 User Group. National Liberal Club, London SW1. 10.30.

SEPTEMBER 21-23
Symposium on interactive techniques in computer-aided design. IEEE Computer Society. Bologna, Italy.

SEPTEMBER 26-29
International computer communication conference, ICCC 78: International Council for Computer Communication, Kyoto, Japan.

SEPTEMBER 27
Intelligent terminals in information retrieval. BCS Information Retrieval Group. London.

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MICRO NEWS

Will Silicon Valley's boom turn to bust?

WHILE the leading European countries are girding their loins to break into the world market for semiconductors, a newsletter published in the US points to growing doubts about the famed Silicon Valley in California, and its long term future as the epicentre of semiconductor development.

The newsletter, strangely enough, comes from Regis McKenna, a California based public relations consultant that handles the public relations affairs of several of the companies that inhabit the valley.

But despite this position, it presents a surprisingly candid view of the potential future for these companies.

It lists four main problem areas for companies already in the valley, and adds a possible fifth for good measure, all of which point to a possible decline in the area as a leading technology development centre.

The four immediate problems the companies face are a shortage of staff, a shortage of land for factory development, a shortage of housing for the existing staff, and a shortage of money to fund future developments and new companies.

The fifth problem, according to the newsletter, is the possibility that the companies in the valley may become unionised, something the companies see as a very real threat if the Labour Reform Act, now in Congress, is passed.

Staff shortages in the valley, especially in senior engineering and management positions, is now getting critical. Other Californian sources have put the vacancy position in this area alone at around 5,000 jobs. Large sign-up bonuses are becoming the norm, with additional six-monthly bonuses for longevity, as the companies raise the job-filling stakes.

Salaries are now sky high, according to Regis McKenna, and job-hopping is becoming the order of the day. This is obviously worrying to the employers, who see their long term future, so closely geared to the performance of key staff, becoming a little unclear.

The available land in California, certainly in the valley area, is being used up at a prodigious rate. It is significant that companies such as Intel, with plans for a new assembly plant in Barbados and a wafer processing plant in Arizona; and Hewlett Packard, which is expanding into Oregon, are beginning to look outside their traditional homeland, around Stanford University.

With all the venture capital that has been available to high technology companies in the valley in the past, it is surprising that money is in short supply, but according to the newsletter, that is now the case.

It quotes Ferenc Lednickzi, president of the new company, Tasa Inc, as saying, venture capitalists "are more nervous today than bankers." A recent Merrill, Lynch report suggested that inflated manufacturing costs now make marketing a new product extremely difficult.

The newsletter points to the amount of "foreign" investment now pouring into the valley, almost as a direct result of this cash shortage.

While hardly writing off the future of the semiconductor business in the valley, the lack of people, land and cash could mean that the coming claims to a share of the technology and market from European manufacturers may carry more impact than previously perceived. After all, Europe now seems ahead in the land and cash stakes.

Six more join Inmos

THE head-count is beginning to grow for the National Enterprise Board-backed Inmos, with six recent staff additions to the three founder members, Dick Petritz, Paul Schroeder and Iann Barron.

In the UK, the first two employees to be confirmed by the company are Gill Ringland, previously with CAP, and Brian Stephens, from the Science Research Council. Both have previously worked with Iann Barron on the SRC's distributed computing panel, of which he was chairman.

In the US, four former Mostek employees have joined Petritz and Schroeder, and are the main cause of the current law suit against Inmos by the US semiconductor company (CW, August 17). They are Ward Parkinson and Dennis Wilson, both design engineers, Dave Wooten, a systems applications engineer; and an as yet un-named layout designer.

Schroeder, himself an ex-Mostek man, and Wooten, are both said to have worked on a new microcomputer development at Mostek, while all the American Inmos recruits are said to have worked on 64K RAM development.

Both the 64K RAM and new microcomputers form part of the planned market areas for Inmos.

Gill Ringland

Liveware File *by Don*

Original machines the next use for bit-slice micros

Tim Palmer reports from California

THE use of bit-slice micros in the design of commercial minicomputers, although not yet widely recognised, is probably the best-known application for the devices, but they also find a wide use in device controllers — about 50 per cent of Advanced Micro Devices' bit slice business, according to AMD's marketing manager for bipolar microprocessors, John Springer — and in process control applications.

"Companies building electromechanical equipment have traditionally used the Intel 8080 as a controller, but it is a slow device and has a poor structure for a controller," says Roy Levy of AMD's product marketing group.

"It is like buying a suit ten sizes too large and taking it to a tailor for alterations to make it fit.

"If you use a bit-slice, you can put your instruction set in microcode, you end up with a proprietary design, and as your machine evolves, you can rewrite the microcode to suit with only minor changes in the linkages."

These processors are typically eight or 12 bit, though the most complex ones use 16 bits.

Springer is well aware of the design limitations imposed by bit-slice technology, which he sees as significant but not serious. A greater problem is that to do an exact emulation of an existing machine, some features can only be incorporated inefficiently.

Levy backs this up, saying that AMD has done an emulation of the 9080, its own version of the Intel 8080, using 2900 chips.

"It just is not effective," he says. "What is the point of emulating the 9080 when the same number of parts can be used to emulate an Interdata mini?"

A straight comparison between the 8080 and the 2901 does not show up the latter in a particularly good light: it is only 10 to 15 per cent faster. "But the key question is, how much can it do in one clock interval?

"The answer is that what the 8080 typically takes between six and 30 clock intervals to do, the 2901 does in one. For example it will add, shift and test for zero in one cycle."

Because of the inherent inefficiences in emulating an existing minicomputer design, Springer believes that companies will increasingly use the 2900 series of components to design original processors, an early example being the Basic Timesharing BTI 8000, which was designed from the ground up around a new operating system (CW, July 20).

"It enables companies to build their own CPU more cheaply than they can buy one OEM," he says.

Another area where the 2900 series has found wide usage is in military minicomputers, mainly 16-bit ones, although there are several as large as 64 bits. IBM and Control Data have both used it in universal emulators into which almost any required instruction set can be programmed, a key requirement in US military contracts where procurement specifications typically require either a given emulation or a specific instruction set.

Despite its obvious attractions, the 2900 series is not as widely adopted as AMD would like, and the company has launched a major campaign in the US to educate and inform potential users.

The AMD family

ANYONE designing a new processor today is likely to look first at the bit-slice microprocessor approach, and chances are that the final choice will be the 2900 family of circuits from Advanced Micro Devices of Sunnyvale, California.

Machines as diverse as the Univac V77, the Telefile Sigma 9, the Basic Timesharing 8000, Interdata 5/16, CTL 8020, Norsk-10/M, Univac UDS 2000, Honeywell Level 6/23 and Harris 550 all have processors which make use of four, six or eight of the versatile 4-bit wide AMD 2901 slice.

The current version of the processor chip is the 2901A, which uses four-level metal fabrication techniques and has a 30 per cent smaller dice than the original 2901.

In a couple of months, AMD will launch the 2901B, which offers a further speed improvement of 20 to 25 per cent over the 2901A, achieved by the use of projection masking, which allows the components on the chip to be formed close together. And an even faster version, the 2901C, is under development.

Last February, AMD introduced another bit-slice micro, the 2903, which is slower than the 2901, but contains 50 per cent more logic circuitry, including built-in multiply and divide.

"The constraint on design is the amount of power dissipated, and our engineering is aimed at improving the power-speed product," says John Springer.

Intel suggests that in microcomputer systems, 95 per cent of the cost lies in the software and only 5 per cent in the hardware.

If the hardware content could be increased to 10 per cent, AMD believes it would be possible to reduce the software to 80 per cent of the original total, giving a net cost saving of 10 per cent.

To this end, the 2900 series features a broad range of peripheral circuit chips each of which includes several computer functions ancillary to the central processor. An example is the new 2904, which includes much of the circuitry which has hitherto been implemented in discrete MSI components around the 2901.

GA introduces low-cost machine tool control systems

A NEW low-cost series of machine tool control systems has been introduced by General Automation, bringing the benefits of floppy disc storage to the numerical control user for the first time.

Called the Spectrum series, the new line is built around the GA 16/110 microcomputer, and includes software modules for 11 different controls ranging from simple positioning to complex multi-axis contouring.

The system includes 12in CRT display and operator keyboard implemented using touch-sensitive alphanumeric and function keys; it supports up to four mini-floppy disc drives as an optional alternative to paper tape. Each mini-floppy stores about 24 times as much numerical control program data as traditional paper tape systems, and allows operating system software to be reloaded at the touch of a button.

GA says that experience gained in the installation of over 2,000 Adapt-A-Path numerical control systems has been incorporated.

Loading the dice

THE technique of packaging several memory dice in a single integrated circuit package, announced last week by Mostek for its 32-bit memory chips (Micro News, August 24), is becoming increasingly popular.

Digital Equipment is experimenting with it at Maynard, and General Automation has been using it for some time to make its 32-bit memory chips.

Mostek's approach is to mount two 16-bit dice side by side, but GA is mounting two sets of four 4K dice back to back for its new chips.

The new chips have enabled GA to reduce its prices below those of DEC and Data General; previously the company's products were about 10% more expensive for a comparable configuration.

The next step is to mount eight 16K dice back to back in two ranks of four, giving 128K-bits in a single integrated circuit package. There are benefits in terms of higher speed, lower power, fewer external connections and greater reliability in mounting several dice in a single carrier.

GA said that the technique took many months to master, but believes that if it were widely adopted it would provide an attractive alternative to 64K-bit single-dice memory chips.

● Our picture shows the way several dice — in this case 1K-bit devices — are mounted side by side in the same chip carrier.

"Computer Weekly", "Data Processing" and "Systems International" present

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FUTUREVIEW

ROBIN WEBSTER TALKS WITH CHRISTOPHER HODDER-WILLIAMS

The progressive slide towards the Age of the Machine

In this Futureview, Robin Webster talks to author Christopher Hodder-Williams, who believes that we are subconsciously adopting computer-like traits — a twist to the tale of machines striving to be human. When he is not writing books like Fistful of Digits, which was the result of a project that probed deeply into the sociological effects of information processing, Hodder-Williams' interests range from piloting a Chipmunk aircraft to using an experimental recording studio at his home where he has pioneered a practical method of achieving reel-to-reel quality from tape cassettes. A trained musician, he has also written about 100 songs for television and recorded an album of songs at the piano.

ACCORDING to Christopher Hodder-Williams, author of Fistful of Digits[1], a book which put him "among the very best catastrophe writers", it is more likely to be man's own folly that ushers in an unpleasant "Age of the Machine," rather than just the pressure exerted by technology itself.

"It has been people, rather than computers who have caused the computer crisis," he says. "I believe that a sane society which had the use of computers would use them very well, but I don't think we are a sane society."

In this type of society, he sees the emergence of people who begin to think, act, feel, and almost become like computers, although driven to this by typically human emotions .... he foresees the computer system that refuses to obey the human override command .... and he predicts military attack and defence systems that play a deadly, computer co-ordinated game of love.

These glimpses are of the future, but Hodder-Williams' concern about the impact of technology stems from pre-computer days. Interestingly enough, he does not view the emergence of computers as something we should fear, but instead believes that they are really only the latest manifestation of a trend that goes back to the Industrial Revolution.

"We have slowly, without realising it, become more affected by feedback mechanisms than we were before," he says. "My first awareness of machines came through very simple books like the Modern Boy's Book of Aircraft, or The Modern Boy's Book of Science. Then I went on to learn of things like the Automatic Train Control of the Great Western Railway which made it impossible for a train driver to overshoot a danger signal; that was a feedback device. There were also things like the system of governors that James Watt introduced into his engines."

But the simplest example of such a system was in his own childhood home.

"I remember that we had a radiogram, which had no feedback system to tell it how many records there were on top of the stack. You had to set a dial to tell it how many there were.

"If you set it at eight when in fact there were seven, it would play the last record twice. I was fascinated to see that the next model introduced had a feeler device which sensed the number of records on top — you didn't have to set anything."

And taking the whole thing a step further, Hodder-Williams has observed a very odd twist in man-machine interaction.

"People are now tending to emulate computers," he says. "They are becoming emulators because they think that they have to compete with them in order to keep their heads above water, to stay in jobs, and so on.

"I found this very much working for a large company .... I tested it out and found that what was happening was a rather frightening narrowing of their vision of life, they were becoming increasingly formula-minded.

"My book, Fistful of Digits, is very much about people emulating computers. I'm afraid of the effect they have on people. I think we can handle them only if we are sensible enough to retain our own identities."

Fistful of Digits, also described as "one of the best anti-technological, pro-human pieces of science-fiction," is Hodder-Williams' account of how George Orwell's book 1984 could become a possibility. The catalyst that can breathe life into Big Brother is indeed computer technology.

[illegible] he says, [illegible] feel that there has to be something to account for a change in behaviour between people. So far as the communications media are concerned, I have the impression that we no longer communicate as individuals, but communicate instead via a television screen."

This is shown to its terrifying limits in "Digits", where the characters inhabit a world in which the computer has infiltrated daily life to the extent that some people even have their respiratory rate controlled by The System. Rather than a human finger resting on the nuclear war "start" button, it turns out to be a metaphorical computer "digit."

"The main character is Peter Shackleton," explains Hodder-Williams. "He is in love with a woman called Christina who has been taken over by the computers. One moment she is herself, the other moment she is a computer spokesman.

"The computers create a simulation of her and it ends up with Shackleton thinking he is talking to the real Christina via a television screen. They've created her purely as a TV version, not a physical 3-D image.

"The computers programmed the simulation simply by using her as the programmer, until they knew how to respond to Peter's loves, hates, and other emotional responses.

"However, Christina herself dies, and the TV image, the computerised embodiment of her, goes on."

If it is true then, that we are beginning to emulate computers, adapting our thinking to their operations rather than vice versa, does this mean that any Big Brother of the 1980s will be a computer, or people who emulate and use computers?

Rather than answer this directly, Hodder-Williams suggests that present trends may give us the answer.

"Well, there are a number of stages to this where computer technology is frightening," he says. "The first is when computers are stupid, as is the case at the Swansea licensing centre, where they make innumerable mistakes. In this type of system you must include the operator as part of the machine. As I argued in 'Digits', the operator is part of the computer, and therefore you can only consider the thing as a whole.

"The second stage is when computers become more intelligent than us anyway and therefore become unbeatable. But the real hook-up between man and machine comes when man has offloaded so many of his functions on to the computer that it realises, in a way, man's inadequacies.

"It has provided him with food, communications, and transport, and everything else, to such a degree that you can no longer press the override button. Because if you did, everything would stop.

"The computer becomes a central repository of information and order to which man himself is not longer capable of aspiring. It is rather as if I were a patient and you became my psychiatrist. If I became so much your patient and you became so much my psychiatrist, I would lose my own ability to act from innate instincts and drives and you would take them over. I think that all we are doing is projecting ourselves on to machinery, very gradually."

An instance of this, he says, is in the use of intensive care equipment in hospitals, where it keeps people alive despite serious injuries or illnesses.

There was nothing to criticise here, he added, but if somehow such equipment or its derivatives were introduced into daily life, the connotations for dictatorial control are obvious.

Did this increasing dependence have a polarising effect then — was it good or bad?

"Well, as I. J. Good cleverly said back in 1975 when he spoke on a radio broadcast done by Dr Christopher Evans, it is very difficult to say. But at the end of the programme, he did say that if you asked a computer whether or not it had taken you over it would probably reply 'No,' because it would not want to give the fact away.

"It doesn't suit it, because by that time it has got an identity, it has become sufficiently self-aware, to have an aim, a goal of its own."

Whether it is working out simple things like square roots or logarithms, or directing a nuclear missile through the atmosphere to its target, a computer only acts as part of a system — or does it?

"This is a very interesting question and one I am often asked," says Hodder-Williams. "It is the speed, the unnatural speed of communications that is at fault. Where there was once a certain amount of inefficiency built in, the computer, of course, can locate differences in a matter of nanoseconds.

"And the whole speed, therefore, the feedback systems that are associated with these responses, have been jumbled in such a way that they have overtaken the normal speed with which human beings react.

"This goes back to the Industrial Revolution again, where at one time we had a village structure in which each village had its own communications system. Each was complete in a way, it had its priest, its doctor, its lord of the manor, and everybody looked after everyone else to a certain extent.

"Now we have extended the whole thing over an enormous front so that we are asked to feel guilty about things we can't control.

"I remember sitting and listening to an appeal on behalf of the Pakistan flood victims when I was living in Somerset in the early 70s. And I was eating an enormous dinner. Suddenly on the TV screen, I was confronted with pictures of people who were starving, and others dying of contaminated water. My reaction was the reaction, I am sure, of many: to go around collecting money.

"Then I thought, well, is this really realistic? There I was watching TV shots of newspapermen landing by helicopter in areas where it was said no parachute drops of food or supplies could be made.

"And I thought, if they could get there and tell us these horrendous things — you know, there they were eating lovely dinners like I was — why weren't they dropping huge supplies of vital food and drugs and so on? So it was a farce, because communications overtook the situation it was supposed to be communicating about."

Thinking in Wellsian terms about the shape of things to come prompted Hodder-Williams to remember the interesting world devised by the writer John Wyndham.

"Wyndham wrote a fascinating book called The Chrysalids[2], and what struck me about it was the environment in which the characters of the book found themselves.

"It wound up with the fact that they had this sort of ESP in which everybody knew what everybody else was thinking. I personally can't see any evil in a society where that is literally true. Because if they know that other people know what they are thinking, it doesn't matter what hang-ups they've got, what secrets they hold, because everybody else has got similar skeletons in their own cupboards.

"But you can't arrive at that situation where computers concentrate power, a tendency which I think is generally accepted. If there was some way of distributing the power they represent so that nobody actually has control over them, and moreover to avoid the fact that computers themselves will eventually have drives and aims of their own, it would be ideal. However, it is awfully difficult to see how you can arrive at Wyndham's lovely and, I thought, inspired, solution where if we are going to have universal information, then the only thing to do is go along with it and say something like: 'OK, it so happens that I am violently attracted by music stands, and I get a tremendous kick out of them'.

"But, as I said earlier, the other thing is what are computers going to want for themselves? This is where Dr Evans is so interesting because he says it might be a good thing that we are serfs of computers; but what evidence is there to support this?

"My own feeling is that when I'm not working, and maybe I'm not typical, I feel useless; I can only feel that I am actually living a life if I am doing something which, whether it is something quite humble like preparing a snack, or whether it is discovering skulls from two million years ago, makes me feel useful."

A good example of a world denuded of its technology and populated virtually by Lotus Eaters is that conjured up by H. G. Wells in his book The Time Machine[3].

Referring to this, Hodder-Williams said: "Now, if we are going to be made useless, as shown in Wells' book The Time Machine, where people literally did nothing, then I don't believe we can be normal."

In his view of the next decade or so, Hodder-Williams feels that human insight will have to be a necessary part of the template of the future.

"I think what happens in the next five to 10 years is dependent on the amount of thought that is put into it. I don't think computers in themselves are dangerous at all. What is dangerous is our lack of insight in estimating what functions they really are performing in society.

"Also, I don't think privacy committees, or anything else being done legislatively at the moment is of any value at all. I think it is just a kind of put-up job that is keeping people quiet.

"In fact, the computer industry is using it as a kind of public conscience where it looks as if it is doing something about it, but really wants to flog its hardware and software.

"I believe that it is a very difficult situation to resolve, because the complexities and the over-specialisation in the whole business of communications media and computer technology means that unless you have committees of at least 15 people, nobody really knows what is going on.

"I don't even think it is a matter of educating people because you can't possibly keep up with the acceleration, the feet per second of the advance of technology.

"All you can do is believe those people who are, at the moment, considered cranks. I don't know what the answer is, all I can say is this: if we ever find a situation where you press the override button and nothing happens, and the thing still goes on buzzing, then we're in trouble. I only hope it happens over something fairly trivial like the override button of a household computer system.

"I hope humanity is alerted by such an example before it becomes something colossal like a nuclear war, where we have an interlock between defence and attack systems which are longing to get in touch because they are made for each other, they are mates.

"If you build a radar and early warning system which is longing by its own nature to detect an invader and, equally, the invader is longing to stimulate the defence mechanisms, then you get an interlock. It suggests to me that this love affair between defence and attack systems could lead to a holocaust.

"I think we are on an absolute knife-edge and, with the neutron bomb coming up and all that implies in terms of instant war, nobody, least of all myself, can predict what is going to happen.

"All one can say is let's be aware of the dangers, let's perhaps paint a blacker picture than is really necessary, in the hope that people will respond to it."

The neutron bomb, of course, is the latest Doomsday weapon, designed to kill by emitting a very high radiation level rather than by sheer explosive force. This way it leaves cities relatively undamaged.

It is an invention that Hodder-Williams abhors, a reaction probably due in no small part to his further fear that computer systems will eventually be making the decision on whether a Third World War remains fiction or an all too terrible fact. The very technology that makes such an unstable position possible becomes the judge of the matter.

So is it time to do something now, or has the time to act yet to come?

"I think we are too late," he says. "The most likely source of a warning now will be from computers themselves, which will not yet have an autonomy but will be sufficiently equipped with indicators to show that something has gone wrong.

"The problem is that people don't extrapolate. It seems to me that one of the things computer people, including companies, have lost, is that they cannot relate minor disasters with the possibility of what would happen if it occurred in a wartime situation or where we were controlling inter-related things like the player and the piano, the doctor and the patient. They can't see that these small events are clear parables that it could happen at a much higher level.

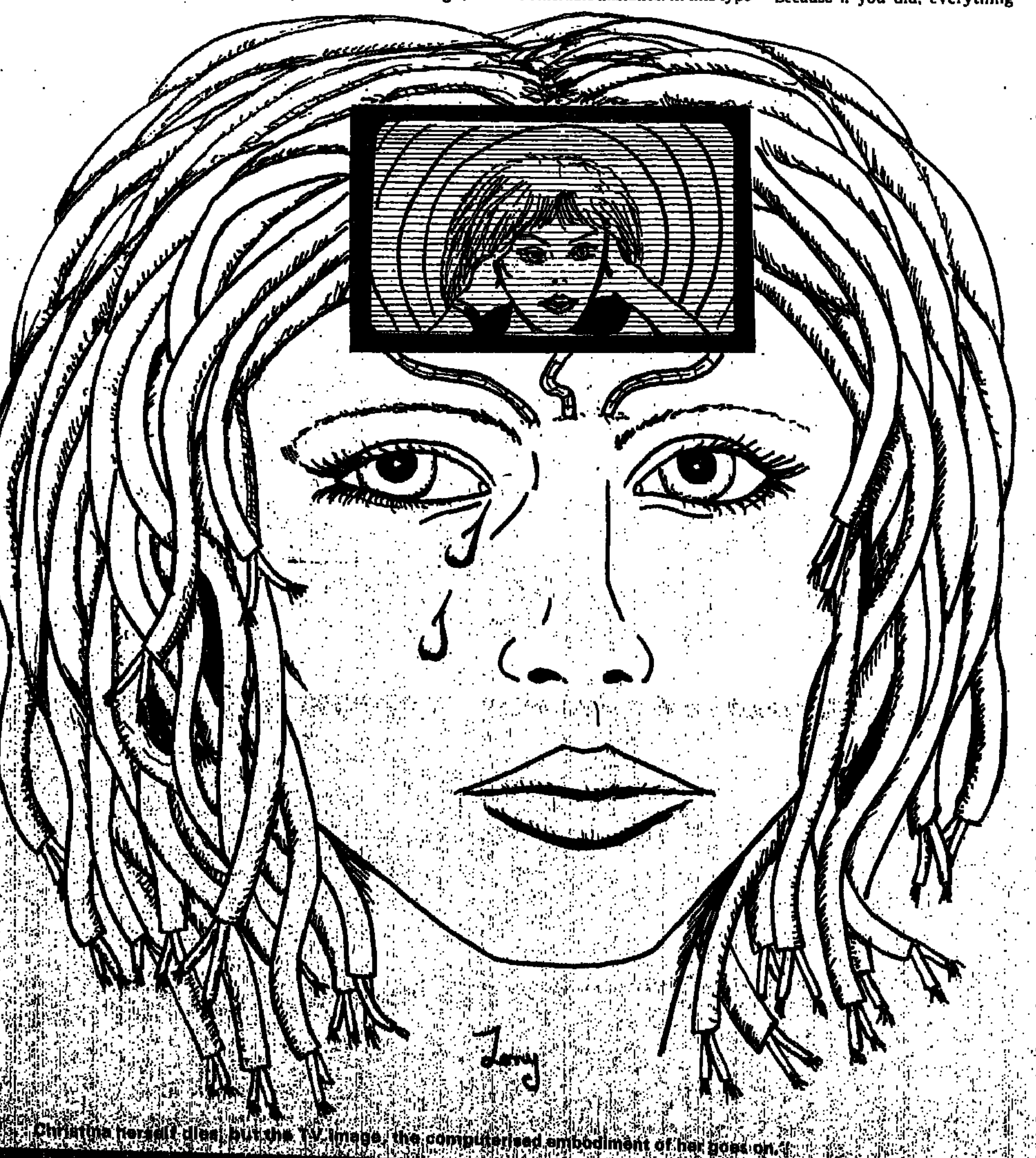
"As for the computer industry, I think my message would be 'examine yourself'. One must have insight, one has to know what one's motives are. Humans are imitating computers and that is what is wrong, but then, of course, one has the other point that computers will eventually be human, which makes it more frightening.

"I remember when I wrote Digits in 1964, I said that we have five years before we reach this man/machine crossover point, and those years are well and truly up. By my own prognosis we are beyond the point of no return, but as a human being, I think that we still have time."

Finally, if there was some way to use Wells' time machine to transport ourselves into the 21st Century, what could we say to the computers that might be in control then?

"I would say, 'Look at the mistakes humanity has made; do you really have to duplicate them at this incredible speed at which you work, or will you have read the history books and learned that it doesn't really pay to have paranoia? That it is best not to want so much power, but only to have a certain amount and settle for that'."

1. Fistful of Digits, by Christopher Hodder-Williams. 50p. Coronet Books, 8 Coronet Street, London, N1. Tel: 01-739 6132.
2. The Chrysalids, by John Wyndham. £1.05. Hutchinson, 3 Fitzroy Street, London, W1. Tel: 01-388 7601.
3. The Time Machine, by H. G. Wells. £2.10. Heinemann, 48 Charles Street, London, W1. Tel: 01-493 9103.



Christina herself dies, but the TV image, the computerised embodiment of her goes on.

"Computers in themselves are not dangerous . . . What is dangerous is our lack of insight in estimating what function they really are performing in society."

f.m. tuner

Our article in this issue describes an f.m. tuner based on an already highly successful design by L. Nelson Jones. The author has now redesigned the circuit around two new integrated circuits which offer an even better performance. A modified and pre-aligned front end module provides a large signal handling capability and simplifies alignment.

Trends in Microprocessors. See also a general discussion on developments now taking place in 4, 8 and 16-bit devices and in bit-slice systems.

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Testing algorithms for any loopholes

IN two excellent articles last year, Donald Davies discussed (a) the concept of a public-key cryptosystem and its importance for cryptography and message authentication (CW, September 15, 1977) and (b) the particular system invented at MIT by Rivest, Shamir and Adleman (CW, September 22, 1977).

The security of this method depends upon the infeasibility of calculating the prime numbers p and q from a knowledge of the value of their product. This assumes that the algorithm has no loophole — but has it?

Referring to the printed table, I noticed that four successive applications of the encryption algorithm always yields the original number M, eg 7-13-52-28-7; 3-27-48-42-3.

It can be shown that if n and k are positive integers such that:

$$s^n = kst - (k-1)$$

then $E^n(m) = m$ for any m.

This means that n successive applications of the encryption algorithm is equivalent to encryption followed by decryption. In this case, the method would be insecure against a cipher text only attack.

In Davies' example s = 3, t = 7, n = 4 and k = 4. The above relationship incidentally covers the special case k = 1, t = s, n = 2.

JOHN PRITCHARD
NCC
Oxford Road
Manchester

Donald Davies: Dr Pritchard has noticed the same apparent weakness in the public key system of Rivest et al that was described by G. J. Simmons and M. J. Norris in Cryptologia 1(4) 1977, pp406-414. The method he describes works well for small numbers.

The question that should then be asked is: "When p and q are well-chosen, what proportion of cases will yield to this attack with a practical degree of iteration?" (n in Pritchard's letter).

Ronald Rivest replied in a note to the Cryptologia issue 2 (1) 1978, pp 62-65. The choice of p and q is important. p—1 and q—1 should have large prime factors $\hat{p}$ and $\hat{q}$ (say) and $\hat{p}-1$ and $\hat{q}-1$ should also have large prime factors. This can easily be achieved.

With these conditions and for the size of numbers recommended for safe cryptography it seems that the probability of cracking the system by iteration in a reasonable number of steps (a million?) is of the order of 10^{-14}. Of course, for small numbers the method seems to work.

I don't wish to imply either (1) that there cannot be another weakness somewhere or (2) that the Rivest system is recommended for practical use. I still have an open mind on both these issues.

LETTERS

To: The Editor, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondents state that their letters may not be cut.

Low cost graphics only a beginning

I AM somewhat bemused and at times concerned at the way one's remarks can be misinterpreted. Is it perhaps the pursuit of brevity as being the more elegant solution (mathematical or otherwise) that opens one's remarks to misinterpretation?

Certainly, sociologists and others in the humanities seem to repeat themselves with the slightest change in shade of meaning to the point of tedium.

My reflections are motivated by a recent conversation. I have long thought the graphics display terminal to be the most powerful peripheral for a computer system and have argued that the delay in CAD has been in part due to the cost of the display facility.

Thus, whereas the computing facility may exceed the cost of the actual display, the incremental cost for graphics as seen by an organisation is that of the display hardware.

The software, after all, is often unseen and unknown at this stage. Accordingly when speaking to Sydney Paulden I said that in the development of graphics the display was like "the tail wagging the dog."

The reference to tail-enders in the context of his article (CW, August 10) implies that I think UK graphics work to be at the tail-end — which is not the case.

It is clear that some UK work is in the forefront but only a part of industry is aware of it. In particular, the advent of low cost graphics is not an end but an important beginning which is overdue.

DERRICK GROVER
Haywards Heath
Sussex

Current thinking of DPMs

BERNARD ALLEN'S comments (CW, August 10) that the majority of data processing managers seem to regard scurrying about the computer room as the sole index of efficiency displays a total ignorance of current thinking amongst data processing management.

In a well-ordered computer room scurrying about either denotes that a crisis is at hand or that the previous shift has left the room in a disordered state.

An absence of addle-headed movement should indicate that the machine is progressing the work according to the predetermined schedule and that the manager can retire from the operations area with an easy mind.

I can find nothing new for operators in Bernard Allen's article that has not already been exhaustively argued elsewhere and he should really concentrate his efforts on providing operators with a realistic and up-to-date view of a data processing management's ideas.

JOHN GREEN
Hampton
Middlesex

Cinderella

I WAS most surprised at the story by Tim Palmer in which he quotes a GEC spokesman as saying: "We chose the Data General Nova because there is no comparable low cost machine available in the GEC minicomputer line" (CW, August 17).

I feel I must put in a word for the cinderella of the GEC computers — the 2050. This is a perfectly adequate little machine although for some reason the company seem only to consider it for RJE terminal and process control applications.

Granted that the normal company's systems software would be inappropriate for this application, we have had a multi-user VDU editing and disc filing system running for several years, and the data communication facilities include an automatic telephone answering feature which is perfectly adequate.

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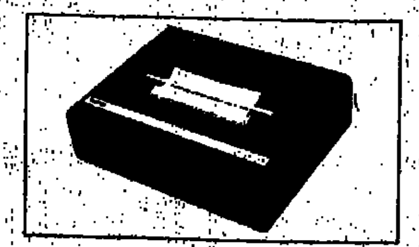

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This post will be filled by a candidate displaying a sound COBOL knowledge, coupled with the ability to liaise with line management and produce results on schedule with a minimum of supervision.

Reporting directly to the Project Manager, the Analyst/Programmer will be responsible for a variety of systems, the majority of which will relate to users in PARIS. For this reason, applicants must be willing to undertake a limited amount of short duration travel.

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Because of continued expansion, the company is keen to hear from candidates displaying a mature approach and a willingness to accept additional responsibilities in order to progress their careers. The salary range is £4500 to £6000 per annum depending on experience.

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Please contact Richard Kaluzynski or Sue Gillam: 01-491 4706 or 01-439 3411.

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هكذا من الأصل

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JBA

Senior Analyst/Programmer

Herts **up to £8,500**

This well known and successful minicomputer manufacturer wishes to appoint a senior person to take responsibility, and be involved in, the design, programming and implementation of its own internal commercial systems. Suitable applicants will have several years experience in the design of commercial applications and be prepared to undertake any of the programming as may be required. In addition to the development work the successful candidate will also be responsible for an existing operations group. Ability to communicate with user departments, control projects and manage other technical staff are obvious prerequisites for this appointment.
This is an ideal opportunity for a senior technician with drive and ambition to move into d.p. management.
It is unlikely that the initial salary will be less than £7,000 and the company offer the usual benefits in a professional environment.

Contact: Margaret Stevens

Systems Consultants

London **up to £8,000**

Our client, one of the largest software houses in Europe, has opportunities for professional staff to join an expanding consultancy team. The work includes advising clients on systems development, design and implementation of medium to large application and project management.
Candidates should have at least five years experience in the design of commercial applications, particularly where real-time or database techniques have been used. A proven background of project leadership is obviously an advantage.
Salary negotiable according to experience. Excellent career prospects. Relocation assistance available.

Contact: Jim Baker

Consultant Analysts & Programmers

Surrey **up to £7,000**

A progressive and expanding U.K. company is seeking to appoint additional competent analysts and programmers to work on development of technical systems incorporating software and scientific aspects. Candidates should have at least three years in the computer industry and be able to design and carry out analysis of real-time applications on minicomputers.
This is an excellent opportunity for the ambitious technician to join a forward-thinking company which offers extremely rewarding and stimulating work, involving a high degree of personal contact.
Excellent opportunities and prospects.

Contact: Margaret Stevens

Analyst/Programmers

City **c. £6,250 to start**

A specialist city bank is keen to recruit two experienced Programmers, to build a small team to help develop and implement a highly sophisticated real-time foreign exchange system.
Training will be given where necessary, but applicants must have worked with the RSX-11M system.
This is one of the more interesting projects in the financial world today, so the experience that successful candidates will gain could prove to be invaluable.
On offer are all the usual benefits associated with a banking environment, on top of a good starting salary.

Contact: Andy Wright

COBOL Programmers

London & Home Counties **up to £6,000**

A large international organisation has a number of opportunities for programmers at both junior and senior levels, to work on commercial development projects.
Candidates should have a minimum of eighteen months experience of COBOL on either IBM or ICL mainframes. Senior programmers should be able to demonstrate a substantial background in commercial applications. Other languages, such as PL/1, RPG2 or PLAN would be considered.
Training will be available where appropriate.
Excellent salaries, fringe benefits and career prospects. **Contact: Jim Baker**

HOLLAND
Programmers (SPL/FORTRAN/ALGOL)

Salary negotiable

A leading commodity trading company, located near Amsterdam, with a powerful HP3000 installation are increasing their applications development team. Development projects include contract administration and reporting systems as well as management position analysis.
Applicants for these staff positions must have commercial mini experience and have programming skill in either SPL (ideally,) FORTRAN or ALGOL.
The successful candidates will be adaptable and self-motivating with the ability to handle both programming and system design.
Ideal opportunity to make the move to the continent into a secure career.

Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
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ASSEMBLER PROGRAMMERS

London (all areas) **£3000 to £7000+**

We have a varied selection of vacancies in all areas of London covering a wide range of programming experience. These positions cover a broad spectrum of the computer industry, ranging from large well established Software Consultancies and manufacturing companies to small retailing and publishing concerns. The equipment in use ranges from 360/40 to large 370/158 mainframes.
All the companies offer highly competitive starting salaries, dependent only upon experience and ability, and fringe benefits vary from Free Lunches and Season Ticket Loans to Travelling Expenses, Annual Bonuses and Subsidised Mortgages.

Reference JC 35/1

ANALYST PROGRAMMERS

C. London **to £6000 + Mortgage**

One of London's leading financial organisations wishes to recruit additional staff to assist in the design and implementation of new projects in their Data Processing Department.
They are interested in people who are either Systems Analysts with a programming background or experienced Programmers interested in systems work. The main language in use is COBOL and experience on any major manufacturer's hardware will be considered as specialist training will be given where necessary to the successful candidates.
In addition to a competitive starting salary the company offers an attractive benefits package which includes L.V.s, flextime and a subsidised mortgage.

Reference JC 35/2

OPERATIONS

Junior and Senior Operators with experience on IBM, UNIVAC Honeywell, Burroughs, NCR, ICL, DEC and PDP are required urgently. Listed below are a selection of our vacancies:- if you don't see one to suit you, give us a ring to find out about the many others we currently have on our books.

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IBM	OS	Shift Ldr	3 yrs	£5400
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ICL	GII	Snr Ops	2 yrs	£4300
ICL	GIII	Operator	1 yr	£4600
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ICL	2900	Operator	1 yr	£3600
Burroughs	MCP	Operator	2 yrs	£5000
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Burroughs	MCP	Operator	1-2 yrs	£4500
Honeywell	OS2000	Operator	2 yrs	£4500
Honeywell	OS2000	Operator	1 yr	£4000
Univac	EXEC8	Operator	6 mnths	£3500
Univac	EXEC8	Operator	2 yrs	£4500

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We have many positions, both Junior & Senior, at salaries up to £6000.

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Systems & Programming **£7000 to £9000+**

Employed by Datascene in a varied and fulfilling role, you will work closely with both clients and our own consultancy staff on all aspects of recruitment; from job identification, through to advertising, interviewing, selection and the presentation of short lists.
You should be 25+, professional in approach, and already have a proven track record of success in the D.P. field, which should include experience within Systems and Programming. This, coupled with sales motivation, business sense and the capacity for hard work, should reap more than ample rewards.
For more information please call Phil Gascoigne.

Reference PG 35/3

REAL TIME PROGRAMMERS

Central London **£4000 to £8000**

One of this country's most respected software houses has a number of opportunities in their Real Time Systems Division based in Central London. Positions exist at all levels from Programmers & Analysts through to Consultants. Assembler or Fortran experience in any of the following areas:- Message Switching, Production Control, Military Systems or Communications, gained on Minis or Micros would be suitable.
An ability to meet and communicate with clients, an outgoing personality and the willingness to pick up new machines and languages is essential.
If you believe that you could comply with the above specifications and would like a rewarding position with an excellent salary and prospects, ring us immediately.

Reference PG 35/4

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Systems Designers Limited controls the career progression of its staff to give them a wide variety of experience, both of project applications and of computer systems. The company is situated on the Surrey/Hampshire border, with good road and rail links to London and yet surrounded by attractive countryside.

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Programmers **Up to £4,500**

Programmers are required with up to 2 years experience. As a leading company in minicomputer and microprocessor systems, Systems Designers Limited can provide you with a wide variety of experience in the technical computing fields.

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Systems Designers Limited require software systems engineers with up to 5 years' experience in Communications, Industrial or Military systems. We can provide you with a rewarding career at the forefront of technology.

If you can match the challenge of a varied and demanding career, then telephone or write to us to arrange a chat or request an application form.

Contact: Bill Hockey
Operations Director
Systems Designers Limited
Systems House
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MORE JOBS THAN EVER!

JUNIOR PROGRAMMERS £3,000 to £4,300
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SENIOR SYSTEMS ANALYST £8,500
C. London
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Central London
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MINI COMPUTER PROGRAMMERS £4,000 to £7,250
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OPERATOR/SH. LEADER £4,000 to £5,400 inc.
Hounslow
Good IBM JCL experience? Then apply for 3 top jobs in this very advanced OS VS1 installation. Perks include subs canteen, 4 weeks' hols., 35-hour week. C.P.S. and bonuses. CW 35/5.

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N. London
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OPERATORS TEAM LEADER To £5,300 inc.
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OPERATOR/SENIOR OPERATOR £5,000 inc.
W.1
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We are seeking an energetic and professional consultant, who is currently engaged in recruitment activities, and has:

* A proven and successful record
* A sales personality, capable of high level client contact
* In-depth knowledge of London and the Home Counties
* The ability to man-manage

As an organization we offer substantial benefits and support, and in return we would look for commitment and an overall fundamental understanding of d.p. recruitment, coupled with a detailed involvement at a recruiting level. All enquiries will be treated with the utmost confidence.

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Ref No. C/8/1

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Computing Services Association

DATA PROCESSING CONSULTANTS SINCE 1970

W. LONDON

One of the fastest growing subsidiaries of an international mini computer manufacturer is moving shortly to brand new offices located W. London, adjacent to tube route. They are seeking an analyst to maintain a high level of back-up technical support within their group. Applicants should be familiar with small/medium mini computers, with additional knowledge of IBM VS or system 3 useful but knowledge of COBOL essential.

- Company expect to expand by 50% in the coming year.
- Excellent training in BASIC and all hardware/software in their product ranges.
- RELOCATION expenses.
- Salary to £6,500 + COMPANY CAR.

Ref. 1709

CITY

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- Large budget allocated for training purposes.
- Variety of new development including DL/I DATABASE.
- First rate opportunity to follow an excellent career path.
- CHEAP MORTGAGE and insurance, low interest loans, season ticket scheme and excellent Sports/Social club.
- Salary: £6,000.

Ref. 1711

LONDON

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- Continued development with a well planned schedule.
- Good promotional prospects.
- Progressive organisation.
- Opportunity to learn new languages and get on to MINIS.
- Salary to £6,300.

Ref. 1700

Programmers

ESSEX

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- Opportunity to move to more advanced technical projects and variety of languages and machines.
- Paid overtime — flexi hours — subsidised restaurant amongst many of the excellent perks.
- RELOCATION expenses.
- Salary to £5,500.

Ref. 1624

Systems Analyst

LONDON

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- Excellent working environment.
- Job security.
- Full banking benefits including subsidised mortgage and personal loans.
- Salary. £7,500.

Ref. 1694

Programmers

MIDDX.

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- Plenty of new development work.
- Training in Database.
- Sports and Social Club in beautiful grounds, heated swimming pool, squash club, etc.
- Excellent perks, LVS, Discount on company goods.
- Salary to £6,250.

Ref. 1658

For further information please telephone or write to our London office: 01-734 0152/3010 (24 hrs.)

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U.K.

IBM CICS ASS/+PL/1	LONDON	£230	p.w.	HONEYWELL 66/00			
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PDP BASIC + RSTS/E	BUCKS	£220+	p.w.	ICL 2900 VMEB COBOL	YORKS	£240	p.w.
PDP MACRO II RSXIIM	MIDDX	£230	p.w.	ICL 1500 ASSEMBLER	LONDON	£200	p.w.
PDP MACRO II RSXIIM	S. LONDON	£220+	p.w.	BURROUGHS 6700 COBOL	SURREY	£200	p.w.
PDP MUMPS	LONDON	£200	p.w.	IBM PL/1 IMS DB/DC	S. COAST	£250	p.w.
PDP MACRO II RSXIIM	LONDON	£220	p.w.	IBM OS COBOL	S. COAST	£220	p.w.

Computing Services Association

OVERSEAS

SYSTEMS PROGRAMMER CICS				BURROUGHS GEMCOS,			
PL/1 + ASSEMBLER	HOLLAND	£400	p.w.	MESSAGE SWITCHING	HOLLAND	£450	p.w.
2900/VMEB/VMEK	LUXEMBURG	£350	p.w.	HONEYWELL 61/62 COBOL	HOLLAND	£320	p.w.
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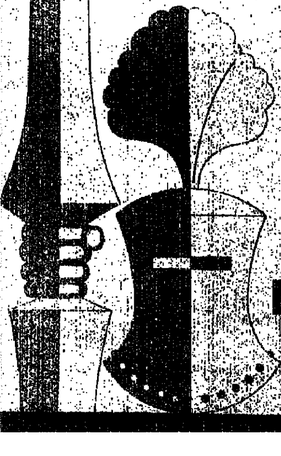

KNIGHT PROGRAMMING SUPPORT LIMITED

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(With a major mini-computer manufacturer)

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Applications from persons, male or female, who wish to move into a genuine marketing role at either a junior or senior level and with a background in D.P. relevant to our Clients' product lines and an empathy with sales are invited to apply

The position offers involvement with:-

- market research
- product definition
- product pricing
- formation of product strategies
- merchandising
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etc. etc.

Join this influential group of Professionals, active in the most buoyant sector of the industry and with one of the industry's leaders. Relocation expenses, profit sharing and private pension scheme apply to the above positions.

CONTACT:- David G. Wade, Advising Consultant
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Ref. No: CW/9/30

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Computing Services Association

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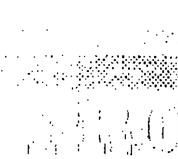

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A major American Systems development company will be interviewing in London for immediate hiring. You will find this a stimulating and challenging opportunity utilizing the latest technology. You will enhance your knowledge, develop management skills and improve your professional career.

EXCELLENT SALARIES, OUTSTANDING COMPENSATION & BENEFIT PACKAGE.

EXPENSE PAID INTERVIEWS LONDON SEPT. '78.

TO ARRANGE A CONFIDENTIAL INTERVIEW SEND RESUME IMMEDIATELY OR PHONE J. FRANK BEGINNING TUES., SEPT. 6, 2 p.m. (REVERSE CHARGES ACCEPTED).

J. FRANK, ROYAL LANCASTER HOTEL
LANCASTER TERRACE, LONDON W2 2TY
01-262 6737

Unusual opportunity for a programmer

Due to the development of computerisation within our firm and our clients a new position has been created in our computer technical support and development function.

This involves:
- the writing and running of enquiry programs at clients using various operating systems,
- the responsibility for the day to day administration of the central audit enquiry programs,
- the provision of technical assistance to departments within the firm developing their own computerised procedures.

You will:
- probably be educated to A level standard,
- be used to working in a commercial environment,
- have at least 12 months COBOL programming experience in either an OS or DOS installation,
- be aged about 20 and looking for an opportunity rarely available at this stage in a career.

Salary circa £4,000 pa and usual big firm benefits.

For an application form write to or telephone Jackie Mundy.

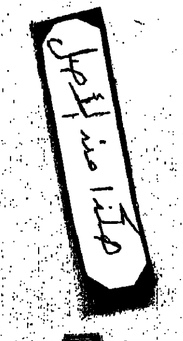
Thomson McLintock & Co, 70 Fitzbury Pavement, London EC2A 1BX. Tel: 01-638 2777.

TML

2 Freelance Analysts WANTED

Above average rates.
Telephone me now on 01-531 9131
Tricia Watts
MANHATTAN

C.A.D. Programmers



THE COMPANY:

Burroughs is an international computer company with a wealth of technology associated with its engineering activities worldwide. The Small Systems Division at Cumbernauld has a powerful design team involved in every aspect of small 'mainframe' computer development. Of particular note is the emphasis placed on the design of large scale integrated circuits using the latest technology.

THE JOB:

- Scientific programming in all aspects of computer design automation and computer aided manufacture.
- Very large scale integrated (VLSI) circuit design automation.
- Circuit and logic simulation.
- Design aids for software development.

QUALIFICATIONS:

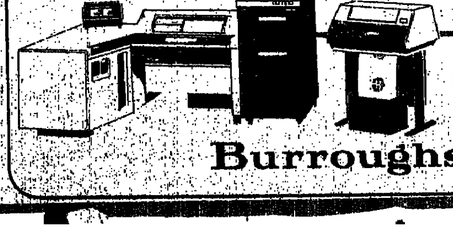
An honours degree in a relevant field Considerable experience with Algol is desirable.

A logic design or electronic background would be useful but not essential.

SALARY:

The salaries will not be a limiting factor in the selection of suitable candidates.

Write or 'phone:
Paul Dunachie,
Small Systems Division,
BURROUGHS MACHINES LIMITED,
Cumbernauld G68 0BN.
Tel: 023-672 8209 (working hours)
Tel: 041-942 5599 (other times)



The Burroughs B80 Computer System designed and developed at Cumbernauld

Burroughs

CAREER OPPORTUNITIES FOR D.P. PROFESSIONALS

- MAJOR GROUP BASE
- NEW VENTURE
- ADVANCED HARDWARE
- TECHNICAL CHALLENGE
- GROWTH ENVIRONMENT
- EXCELLENT REWARDS

ANALYSTS to £7,500 PROGRAMMERS to £6,500

Originally established to support companies within the Powell Duffryn Group (turnover £343 million), Powell Duffryn Computer Services has developed into a systems house providing a wide range of services in the data processing market. In September we move to a new centre in Basingstoke, from which we will supply Timesharing Services, Bureau Services, Turnkey Systems, Manufacturing Control Systems and Applications Software to a wide range of clients operating in a variety of industries. We are one of the largest commercial users of DEC hardware in Western Europe and we are installing at Basingstoke four large mainframes: three DECSYSTEMS-10 and a DECSYSTEM-20 plus PDP-11 MINICOMPUTERS.

The majority of the systems which we develop use on-line facilities and we have a large number of new systems which we are contracted to develop. To enable us to sustain our rate of growth, we are seeking SYSTEMS ANALYSTS and PROGRAMMERS at all levels, both to work in existing teams and to allow us to establish the additional teams which we require.

We are looking for people to join us at a key stage in our development who are able to meet the challenge, grow with us and share in our success. Starting salaries are competitive and progress is geared to performance.

Your background is less important than your desire to realise your potential in an environment which provides the necessary scope for growth and recognises and rewards the contribution which you are able to make.

Programming languages in use are COBOL, DIBOL, BASIC, FORTRAN and ASSEMBLER. Operating Systems are TOPS-10, RSTS and CTS 300. Training, where required, will be given in DEC hardware and software and in the use of interactive program development facilities.

If you are interested in discussing your future with Powell Duffryn Computer Services then send c.v. details to Trevor Lewis, at: Powell Duffryn Computer Services, Abbey House, Farnborough Road, Farnborough, Hants, or telephone him on 0252-49966.

Powell Duffryn
COMPUTER SERVICES

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

CHIEF PROGRAMMER

BEDFORDSHIRE **Up to £7500**

Our client, a large manufacturing organisation, totally geared to Data Processing applications, have invested heavily in hardware and plan to continue investing to keep pace with their successful growth.

The company are seeking an experienced programmer to assume the responsibility of chief programmer for their production biased systems. The ideal applicant will have a strong ICL background, be skilled in commercial manufacturing and production applications to establish the command and respect of a large team.

Situated in very pleasant rural surroundings, the company offer an excellent salary, regular career assessments, subsidised canteen and a very active sports and social club. A competitive relocation package is also offered to assist candidates of the required calibre.

Ref. W1/3108

SALES TRAINEES

U.S. Bureau

CENTRAL LONDON **1st Year Min. £5000**

This rapidly expanding timesharing bureau is seeking sales trainees to augment a busy sales team in their City office. The Company market a range of powerful software products in the financial modelling, corporate planning and marketing analysis fields.

Successful applicants will receive an excellent training in both the Company's products and sales technique. Training will extend over the first six months with Trainees moving into an active role during the second half of the year. Sales Executives with the Company are currently earning salaries in excess of £10,000 per annum.

Applicants should have a minimum of 2 years on commercial experience, gained in either a D.P. Accountancy or Marketing organisation. Educational background and communication skills will be major contributory factors, together with the desire to join a fast moving American Company with turnover over $150 million.

Ref. W2/3108

ANALYST/PROGRAMMERS

RPGII

WEST OF LONDON **To £7000**

Excellent opportunities for career progression exist within this successful organisation which is currently seeking people with a background in RPGII programming to develop new commercial systems.

Applicants are required at all levels and senior candidates can expect to rapidly assume a Project Leader role. On-line processing techniques are employed, and full training will be given in all relevant skills, where necessary.

Company benefits are comprehensive, and the candidates appointed can look forward to a demanding and rewarding future in a progressive environment.

Ref W3/3108

12 MONTHS ANY LANGUAGE

LONDON & HOME COUNTIES **From £4250**

These positions offer career paths which include Database and Real-Time applications, Minicomputer-based interactive systems, the opportunity to work with advanced hardware configurations, formal training and eventual progression to systems analysis

If you are in your first programming position this may be the opportunity to consolidate your experience for which you've been waiting. Our client is seeking Programmers with a minimum of twelve months' programming gained in a commercial, financial, industrial or governmental environment. You will be involved with a variety of applications and will be able to further your computer career in a positive way.

Starting salaries are negotiable depending on experience.

24-hour answering service
Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 0981

Glaxo Operations UK Limited

Two Crucial Dates for Computer Professionals

Hear about the exceptional opportunities we're offering to

Project Leaders Senior Analysts Analysts Programmers

For our exciting new development using mainframe and minicomputers in a distributed processing environment, including on-line and database, we're looking for staff of the most able and imaginative calibre to guide and support this challenging project, not only at GREENFORD, but also at LIVERPOOL, BARNARD CASTLE and WARE.

To make sure we get them – and quickly – we're making two opportunities available to tell you about it informally, in a hospitable atmosphere, on whichever of the occasions indicated below is most convenient for you.

So choose one of the hotels on the appropriate day and come along – and hear about the very competitive salaries and the whole attractive future that goes with them. If you can't make it, please telephone 01-422 8434 ext. 281, and ask for Peter Byers, or if you're in the north, ring 061-486 1881 and ask for Bill Presley.

CHOOSE FROM:

The Great Northern Hotel Nr. Kings Cross/St. Pancras 5th September, 2.30-8.30 p.m.

The Master Brewer Hotel, Hillingdon
(on A40 near Hillingdon Underground)
6th September, 2.30-8.30 p.m.
Car Parking Available.

LOGISTIX

Data Processing Recruitment Consultants

Senior Mini Specialists Holland

Salaries: £9.5—15K.

Our Client is a major International Systems and Software Development Group recognised as Market-leaders in their field. Owing to continued expansion in a wide variety of applications areas including Data Communications, Message Switching, Computer Networking and Mini Computer Software, a significant number of experienced permanent personnel are urgently required.

Emphasis will be placed on technical achievement and in depth experience in the areas of activity outlined above. Whilst a degree or equivalent qualification in either Computer Science or Mathematics is desirable, significant relevant experience will be considered in lieu.

Of essence is a solid Assembler background within a Mini-computer environment. Project locations throughout the Benelux provide a wide and interesting environment which include Amsterdam, The Hague and Rotterdam. Of prime importance is demonstrable enthusiasm to re-locate to the Netherlands for an extended period. Every assistance will be given in relocation, including cost of removal of all personal effects, initial accommodation expenses and a resettlement advance.

Interviews will be held in London during September and offers of employment will be made within 10 days of interview.

Ref 22/A

Main-Frame + Mini Programmers Greater Manchester

Salaries: £6—9.5K (a.a.e.)

A very prestige client with headquarters in London and regional offices located in Cheshire and throughout Europe urgently requires the following: Real-Time and on-line Programmers, Systems and Data base designers and compiler specialists with 2 - 5 years experience.

Of particular interest would be people with relevant experience in one or more of the following: IBM or ICL with Assembler, PL/1 or COBOL and Ferranti, DEC with Basic, RTL/1 or Coral. Also IMS or similar and Data Base design personnel are urgently sought.

The scope of projects is both broad and demanding and certainly in keeping with the prestige of this client. You will play an important role in project development and the opportunity to enhance your technical expertise is one of the attributes of working with this reputable group. Fringe benefits are well above average and full relocation expenses will of course be met.

Ref 22/B

Mini Analysts + Programmers Berkshire

Salary: £6—9.5K + Benefits

The forefront U.S. manufacturer of Mini computers has retained Logistix to aid in recruiting commercially oriented Programmers and Systems Analysts preferably with useful experience on Mini computers however COBOL programmers from a Mainframe background will also be considered.

The successful candidates are likely to have a sound financial/commercial background in either banking, insurance or similar fields and programmers must have extensive COBOL knowledge accustomed to working to strict documentation standards.

This company offers the most challenging career opportunities to those who seek to enhance their experience through state-of-the-art hardware and applications.

In addition to top salaries our client offers all the fringe benefits normally associated with a major U.S. corporation. Interviews will be held early in September and offers made within 10 days.

Ref 22/C

Commercial Programmers + Analysts East Midlands and London

Salaries: £5.5—9K

We are retained by one of the U.K.'s leading turnkey suppliers. The company has been established for eight years and has successfully supplied commercial systems and packages, custom built around DEC PDP 11 hardware. More recently the company has formulated plans to develop software and market IBM series 1 packages.

The company having set for itself a rapid but controlled expansion plan now seeks Programmers and Analysts for its Midlands Head Office and two South-East support divisions.

Successful Programmer candidates must demonstrate an in-depth knowledge of RSTS/RSTS-E with Basic Plus programming experience whilst for the Systems Analyst/Designer positions a minimum of two years experience of commercial systems design and implementation is desirable. Those who are currently involved with on-line interactive systems combining past programming knowledge are especially welcome. Specific PDP 11 or IBM series 1 involvement is not essential but mini and/or micro-computer experience is mandatory.

Early interviews can be arranged to suit applicants geographical location whilst offers of employment will be made within seven days of interview.

Ref 22/D

Systems Development (Pre & Post Sales) Central London and Thames Valley

Salary: to £10K + Car

Two divisions of a prestige Systems and Software Group are seeking additional personnel at all levels of experience.

Generally speaking applicants should have experience in one or more of the following application areas:—

COMMERCIAL — equipment selection and implementation, organisational reviews and systems development plans.

TECHNICAL — compiler design, operating systems and communications software. In both divisions you will be given opportunities to act in a pre or post sales environment.

The Company offers an outstanding portfolio of Company benefits including a minimum of 4 weeks holiday, Group medical insurance and Store purchase facilities whilst more senior staff are eligible for an annual bonus (currently assessed at 10% of salary). Full removal assistance is available where appropriate. Local interviews in Chester, Manchester, Central London and Reading will be arranged to suit requirements.

Ref 22/E

Logistix, Freepost 32, London W1E 3YZ
01-491 4636 (Reverse charges) **Telex 28800**

LOGISTIX

Avon House, 356 Oxford Street, London W1N 9HA

NEW ICL 2960 INSTALLATION
SWINDON, WILTSHIRE

Senior Operations Staff

Our client, a major British group with a unique record at home and in exports, is centralising its DP service division in Swindon, Wiltshire, in brand new, purpose-built premises based on a central large scale ICL 2960 main frame under DME. To meet wide-ranging long-term development plans, the DP Services Division wishes to recruit a number of senior operational professionals. Where appropriate comprehensive training will be provided.

These are ground floor opportunities for people with the right experience and aptitude, to develop worthwhile and rewarding careers in DP and the company is geared to a comprehensive staff development and training programme, where people with obvious talent are given every opportunity to progress. The client is able to offer good starting salaries and unique benefits to successful candidates and an excellent relocation package. In addition, whilst the building in Swindon is being completed (January 1979) he will pay all travelling expenses and provide local transport to those people necessarily required to work for a short period in West London.

Shift Leaders — up to £6,200

You should possess 4 years' operations experience on ICL System 4 equipment in a J1800/DOS environment, be a resourceful supervisor of operations staff, and able to communicate at all technical levels. Experience in an ICL 2900 large machine environment under DME would be advantageous, as would supplementary IBM 360/370 operations exposure. (Ref G600)

Operators — up to £4,900

You should possess a minimum of 2 years experience in operations, either in ICL System 4, IBM 360/370, or other comparable hardware. (Ref G601)

TO APPLY

Applicants, male or female, are invited to send a simple ONE PAGE NOTE (handwritten) covering the following brief details: name, address, age, daytime and home telephone numbers, operations experience to date, previous employers and positions held, relevant hardware experience, present employer and position and salary, to TONY SPURR, Management Recruitment Division, quoting the RELEVANT REFERENCE NUMBER, at the address below. All applications will be dealt with promptly and in strict confidence. Applicants will not be asked to complete application forms prior to an offer.

BIS Applied Systems Limited
York House, 199 Westminster Bridge Road
London SE1 7UT
Telephone 01-633 0866

BIS Applied Systems

Systems Analysts

Opportunities in Australia

up to £11,300 equivalent

The National Mutual of Australasia has a significant IBM installation including 3032 and 370/158 C.P.U's, with peripherals including large capacity disc storage, over 60 remote display terminals and a high speed communications system throughout Australia and New Zealand.

The company has implemented the IBM Information Management System for both Data Base and Data Communications Management. This acts as a basis for new development projects, both on-line and off-line, associated with major areas of the life and general insurance business.

The Systems Division requires a considerable expansion of its systems analyst establishment to initiate a range of development activity. A specialised post of Standards Officer is also vacant and senior analyst applicants may wish to be considered for this appointment.

Appointees at the senior analyst level will have approximately 5 years experience or more in systems analysis covering the design, development and implementation of medium sized computer systems, possibly including two years of systems analysis in a data base and/or on-line environment leading a small group of systems analysts and/or programmers.

Other appointees to analyst positions will have upwards of 2 to 3 years systems analysis experience in medium sized computer systems. Experience in a commercial environment is essential; knowledge of life assurance or superannuation practices would be an advantage. Applicants for the post of Standards Officer will in addition have demonstrable experience in the determination and implementation of standards covering all aspects of project management, systems analysis and systems documentation.

The location is the National Mutual Head Office in Melbourne, Victoria. Benefits include competitive salary, attractive contributory pension scheme, and considerable assistance with home purchase. National Mutual will assist with the removal of furniture and effects and arrange temporary accommodation in Melbourne.

Salary will be in the range $A14,000 to $A18,500 per annum.

For an application form man and women are invited to write or telephone in confidence to Geoffrey Laycock at the address below. (telephone 01-229 6742) quoting reference 590/CW.

Urwick Dynamics Limited
Computer and Selection Consultants
9 Monmouth Road
London W2 4UT

هكذا من الأصل

ANALYST/PROGRAMMERS CIRCA £5,500

The Gateway Building Society with assets over £550m. is one of the larger societies in the country.

Analyst/Programmers are required for the main offices in Worthing, on the Sussex coast.

The Job:
To form part of a team embarking on the development of a large financial application.

The Person:
The successful applicants will be able to offer 3-5 years confirmed experience in D.P. and be able to demonstrate a thorough knowledge of the activities involved in all phases of analysis and programming. Previous experience in the use of structured techniques would be an advantage although a willingness to adapt to such an environment is of greater importance.

The Installation:
The Society operates its on line and batch systems on an IBM 370/148 using CICS and DOS/VS and ANS/COBOL as the prime application language.

Benefits:
● Preferential Mortgage Rate ● Free Life Insurance Cover ● Subsidised Lunches ● Good recreational facilities including swimming pool, squash and tennis

Applications giving details of relevant experience to date should be sent to:

The Data Processing Manager,
Gateway Building Society,
PO Box 18, Worthing,
West Sussex BN13 2QD

GATEWAY BUILDING SOCIETY

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE
(University of London)
Keppel Street, EC1E 7HT

DEPARTMENT OF HUMAN NUTRITION

COMPUTING ASSISTANT

The Pre-School Child Growth Survey requires an experienced computing assistant who will be employed as a member of a team up to 30 September, 1981, on the handling of data from a large longitudinal survey in preparation for computer analysis, and in particular on computerized checking, handling of data files and preliminary tabulation.

The computer used is the University of London Computer Centre CDC 6600 system. A knowledge of FORTRAN would be useful.

The gross salary will be within the range £3480-£4711, depending on age and experience. Applications, consisting of full career and education details and naming two referees, should be sent to Secretary (A1) at the School.

FOR CLASSIFIED ADVERTISEMENTS IN COMPUTER WEEKLY
Ring Eddie Farrell or Mark Williams on
01-261 8028
01-261 8019

BICC TELECOMMUNICATION CABLES LIMITED

Analyst Programmer

Up to £5,346 + bonus

BICC Telecommunication Cables Limited is an operating company within BICC Limited, which is a British based International Organisation employing over 54,000 people in the U.K. and Overseas.

An Analyst Programmer is required for the Computer Systems and Data Processing Department of Prescot Cables.

This is a manufacturing unit with its own Technical and Services organisation, employing some 760 people.

The computer configuration includes a Central ICL 1904S with magnetic tapes and discs operating under George III.

An ICL 2900 with on-line terminals has just been commissioned and the successful candidate will be involved with re-developments for the new machine.

Applicants, male or female, should have at least two years' COBOL programming experience, preferably with ICL machines. Systems experience would also be an advantage.

The post carries a progressive salary range from £4029 to £5346 p.a. plus an annual productivity bonus of up to 7½%.

Career opportunities in the computer function extend across the whole of the BICC Group. A first-class pension scheme has been long established.

Prescot is convenient to the cities of Liverpool and Manchester and is within easy access of North Wales and the Lake District. A modern and well equipped Social and Athletic Club offers plenty of scope for leisure activities at Prescot itself.

Please write to:
Stan Lord (ref. SA34/106)
BICC Telecommunication Cables Limited
P.O. Box 1
Prescot
Merseyside
L34 5SZ

BICC

GERMANY
IBM OS

Programmers £12K-£17K

Project Leaders £15K-£18.5K

A well-established German software house with strong British connections, is looking for OS specialists with a minimum of 3 years relevant experience, in either systems or applications programming.

Contracts will initially be for a period of one or two years. A knowledge of German is not essential, and applicants who become proficient in the language by the end of their contract period will have the opportunity of permanent employment.

Interviews will be held in London in late September. Applications are encouraged from programmers who are available for assignment any time before mid January 1979.

Please send full career details to:

John Godfrey
Computer Anwendung Für Management Gmbh
Kaulbachstrasse 1A
8000 MUNICH 22

LONDON BOROUGH OF ENFIELD

Systems Analysts

£5,058-£5,358

We wish to fill two posts that have been created to assist with the Borough's computer development. Preference will be given to any person with relevant experience in programming and systems work but applications will be considered from those with several years' experience in other disciplines who prove to have the right aptitude for the work of a computer department.

The Borough is currently equipped with an ICL 1902T with 64K Store, EDS 60's and magnetic tapes. Remote terminals are being installed and extensive development is planned. These posts offer a varied and demanding job in a modern office with attractive surroundings bordering rural Hertfordshire.

Temporary housing (up to 2 years), 100% removal expenses (£400 max.), generous relocation costs and lodging allowance —where appointee needs to move.

Further information obtainable from Ian Grey, 01-366 6565, Ext. 2628. An application form is available upon receipt of s.a.e. from the Borough Treasurer, P.O. Box 54, Civic Centre, Silver Street, Enfield, EN1 3XF. Closing date 15th September, 1978. Please quote reference ORA/302.

BUNZL MEANS BUSINESS

Our business is backed by the major British £200m Bunzl Group. We are a fast expanding systems house, producing turnkey and packaged-based on-line commercial systems using PDP 11 computers.

Our success means opportunities for people with mini experience at

AMERSHAM & MOORGATE

as our next phase of growth takes us up from 25 to 40 software professionals.

PROGRAMMERS	**£4-6K**
TEAM LEADERS	**£5-7K**
PROJECT MANAGERS	**£6-8K**
SYSTEMS CONSULTANTS and CONTRACT PROGRAMMERS	**Neg**

RSTS experience desirable. Friendly atmosphere — good facilities. Excellent short and long term prospects.

INFORMAL INTERVIEWS
at our Amersham Datacentre
4-8 p.m. Tuesday, 5th September
9-1 p.m. Saturday, 9th September

or contact:
Jenny Dalrymple-Hay on 01-493 2947
William Key & Partners, 4 Half Moon Street, London W1
or David Changer, Software Director
or Peter Yeomans, Software Manager
BUNZL DATA SYSTEMS LTD.
Meteor House, White Lion Road, Amersham, Buckinghamshire (on the A404)
Telephone: Little Chalfont (02404) 4466

bunzl

NORTHERN RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on September 28 and will highlight career opportunities in the North.

Space reservations should be made as soon as possible to:
Owen Kelly — Manchester — 061-872 4211
Eddie Farrell — London — 01-261 8097

Copy Deadline: PM Friday before

COMPUTER WEEKLY
THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

Edmund Howard's Client Album

PROGRAMMERS CONSULTANTS

£11,000 to £18,000

Holland

A highly respected firm of international consultants with an impressive track record in commercial data processing is currently recruiting experienced computer personnel to work in Holland. Ideally, candidates should have a strong commercial background encompassing real-time systems, accounting, Banking or Insurance. Assignments can be negotiated short term (6 months) or long term (indefinite)
For further details please quote Ref. C W 197.

AVIONICS/SCIENTIFIC PROGRAMMERS

Home Counties/ South of England

Optional Foreign Travel

We have a large number of openings for people with scientific or avionics expertise. These opportunities are wide and varied and some involve European and transatlantic travel. Candidates should hold a degree in a scientific discipline and have experience of Mini Assembler and/or Fortran. The U.K. appointments are placed throughout the south-east including London and the home counties and all are with reputable, established companies
For further details please quote Ref. C W 198.

SENIOR PROGRAMMERS ANALYST/PROGRAMMERS

Salaries £9,000-£18,000 neg.

The Netherlands

If your experience encompasses Computer Communications/Message-switching or Telecommunications then our client would like to hear from you. This leading consultancy company is now recruiting specialist expertise to assist with the development of some of the most advanced packet switching systems in Europe. Previous involvement in either a manufacturing or Software House environment would be useful. A knowledge of real-time languages is also essential. Projects can be arranged on either a contract or permanent basis
For further details please quote Ref. C.W.199.

TECHNICAL AUTHORS

Salary to £7,000

South of England

We have a varied selection of openings for Technical Authors throughout the south. These appointments are all with major computer manufacturers and therefore require some previous experience in the production of technical specifications and software manuals. If you would like further information on any of these appointments please quote Ref. C W 200

SYSTEMS PROGRAMMERS

Salary to £8,000

West of London

We are seeking on behalf of a leading Mini/Mainframe Manufacturer, systems programmers to work on the development of basic software. The ideal candidate will have worked for a computer manufacturer or software house and have experience of developing software products
For further details please quote Ref. C.W.201

FREELANCE

Salaries negotiable

U.K. & Overseas

From time to time we are asked by a number of U.K. and overseas clients to recruit personnel for short and long term assignments. So, if you are between jobs or are due to complete your current contract it might just be worth your while to give us a ring quoting Reference C.W 205.

COBOL PROGRAMMERS

Salaries £4,000-£6,500

London S. E.

A young and highly successful software consultancy with a rapidly expanding order book, is now seeking COBOL programmers with around two years' experience to help consolidate and develop new business in London and the south-east. Projects cover a wide variety of applications, mainly in the commercial sector, and offer plenty of scope to creative, career minded individuals. For further details please quote Ref. C.W.203.

SALES SUPPORT CONSULTANTS

Salary £6,000-£7,000. Expenses + Bonus

London and South

You will play a very important front role assisting the sales team of a large International Organisation. Responsibilities and duties will necessitate working on client premises periodically, ascertaining and compiling technical specifications which will assist the sales force to successfully accomplish their tasks. Applicants must possess a good commercial D.P. background along with a pleasing and helpful attitude.
For further details please quote Ref. C.W.204.

FORTRAN PROGRAMMERS

Salaries £4,500-£6,500

London

A leading London based engineering firm currently requires Fortran programmers with two or three years' programming experience in a software house type environment. As well as maintaining and developing existing suites of programs there will be substantial involvement in customer liaison and technical support. Rapid career advancement is envisaged for those with the right background, qualities and experience
For further details please quote Ref. C W 202

Edmund Howard & Partners

Computer Personnel Consultants

5 Brighton Road, Surbiton, Surrey. Telephone 01-399 9183.
38 Grafton Street, Dublin. Telephone 776,756.

ANALYST/ PROGRAMMER

To join our small but enthusiastic team of professionals engaged currently in the development of real time systems

Many and varied extensions are planned on our Honeywell 62/50 system, and the successful candidate will be expected to play a leading role in the design and implementation of these enhancements

Reporting directly to the Data Processing Manager, you should have a sound programming background in COBOL, and preferably 2 years' experience in the design and implementation of computer systems.

Preference will be given to those candidates with experience in 'on-line' systems development.

Recognising the need to recruit a top D.P. professional, the company are prepared to pay a highly competitive salary to the right person.

Reply in writing for application form with brief résumé to:
C. N. V. Peters, Personnel & Training Manager, D. Byford & Co. Ltd., Abbey Lane, Leicester.

Byford
A member of the Coats Patons Knitwear Division

COMPUTER ENGINEERS

MA COMPANY, THE LEADING SUPPLIER OF MPUTER AIDED DESIGN SYSTEMS REQUIRE AD-ONAL STAFF FOR ITS CUSTOMER ENGINEERING ARTMENT.

Field Service — to be based in Leicester area.
Engineer to be based in our West London workshop
ity.

successful applicants are likely to have several s' experience, some of which will have been spent a mini-computer manufacturer. Salary and condi-s of employment will prove attractive to those le who are currently at the top of their salary ladder.

ning will be given at our home office located in nyvale, California. Please write in first instance to a Company, 10 Bonley Mews, Fassage, London

---

BL Cars Data Centre — Simply Advanced

The brand new multi-million pound, purpose built Data Centre of BL Cars is one of the most advanced Computer technology centres in the world.

The first part of the sophisticated project has been completed to schedule and the last phase, to transfer all existing IBM Mainframes within the Company must be finalised by the end of this year.

You may have seen our advertisements over the last few months, we have recruited many very experienced people, but we still need the following, and only the best.

Shift Leaders
Senior Computer Operators
Computer Operators

Ideally you will have experience in at least two of the following areas: VM, DOS/VS, VSII, HASP, MVS, TSO, IMS or CICS. More important, you should also have a genuine interest in Computing as a career and not just be a button-pusher.

Benefits are those you would expect of a major company and include salary up to £5,700 including shift allowances, 5 weeks' holiday, pension/life assurance and sick pay schemes, substantial discount on BL Cars and accessories. Generous relocation assistance will be provided as necessary to this pleasant rural area where housing is favourably priced.

So, if you are looking to be part of a successful team, using the finest equipment available and the idea of internal and external training appeals to you, ring Rod Watts now on Redditch (0527) 28515 or alternatively write for an application form to:

Operations Manager
BL Cars Limited
Data Centre
PO Box 5
Redditch, Worcs.

BL Cars Limited

CONVERT TO A CAREER WITH

TESCO GROUP HEADQUARTERS

CHESHUNT, SOUTH HERTS.

Converting to one of the largest IBM configurations in Europe to include 370/3032 and 3031. Salaries and other benefits are excellent, individually negotiable and are designed to attract and keep high calibre staff in an environment uniquely able to provide accelerated career developments

Systems Programmers

(4 posts)

- MVS + TSO
- IMS + SNA
- IMS
- LANGUAGES + CICS

Training Officers

(3 posts)

- Operations
- Systems
- Programming

Operations Planning Officer

Responsible to Operations Planning Manager for provision of assistance and guidance in any area associated with the development, acceptance and implementation of new and converted systems and systems enhancement

Notes

THESE ARE ADDITIONAL POSTS TO COMPLEMENT AN 8-MAN TEAM WORKING ON THE FIRST IBM 3032 IN THE U.K.

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This Day Telephone Preston (0772) 21072 (24 hr. service) for full job specs. and application form

Interviews:

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We've made things easy for you!

If you're chasing a new job or a new contract, save time by filling in your application form here and now.

Personal Please write in ballpoint, using block capitals.

Surname ______ Forenames ______

Address ______

Tel. Home ______ Office (discretion will be used) ______

Age ______ Place of Birth ______ Car? ______

Are you prepared to relocate? ______ UK/Abroad (delete)

Experience Place no. of yrs. in box, e.g. IBM 360/370 4

Machines: Please specify model.
- IBM 360/370
- IBM others (specify)
- ICL 1900/2900
- ICL others (specify)
- Honeywell
- Univac
- Burroughs
- PDP
- Other mainframes (specify)
- Other mini-computers (specify)

Applications
- Commercial
- Financial
- Payroll
- Production control
- Stock control
- Scientific
- Realtime
- Software
- Database
- Message switching
- Communications
- Data transmission
- Central process
- Teleprocessing
- MIS*/CPA*/PERT*
- Magnetic tape
- Disk
- Others (specify)

Languages
- Cobol
- Plan
- Assembler
- PL/1
- Fortran
- Filetab
- RPG11
- Auto*/easy*/user code*
- Others (specify)

Job Titles
- Project leader
- Systems analyst
- Systems engineer
- Analyst/programmer
- Systems programmer
- Programmer
- Operations supervisor
- Operator
- Consultant
- Sales representative
- Others (specify)

Operating Systems
- DOS
- OS
- George (specify)
- CICS*/HASP*/GRASP*
- DBOMP*/MVT*/IMS*/CMS*
- Others (specify)

*Delete where inapplicable

Position sought Please state briefly the type of appointment you are seeking.

Minimum salary £ ______ Notice required/Date available ______

Signed ______ Date ______

Cut out the whole advertisement and post to the address below.

Knight

Knight Computer Services Limited

Staff Services Division of BOC Datasolve Group and a member of Computing Services Association.

Knight Computer Services Limited, 14 Old Park Lane, London W1Y 4NL.

01-491 4706

24-hour answer phone

CHELMER INSTITUTE OF HIGHER EDUCATION
Victoria Road South,
Chelmsford, Essex
Faculty of Technology
Advisory Unit for Computer Education in Essex

This expanding Unit has created two new posts:

1. SYSTEMS CO-ORDINATOR
2. APPLICATIONS PROGRAMMER

The Systems Co-ordinator will provide support for the Computer Service Manager. The Applications Programmer will provide programming and advisory support for the Unit.

Salary scale: Lecturer II £4,101 to £6,558 p.a.

Application form and further details from Dean of Faculty of Technology. Telephone: Chelmsford 54491 extension 240/242.

Application forms to be returned to the Institute Secretary within 14 days of appearance of this advertisement.

UNIVERSITY OF SOUTHAMPTON
Machinery Health Monitoring Group

COMPUTER PROGRAMMER

The Machinery Health Monitoring Group at the Institute of Sound and Vibration Research will shortly be beginning work on a contract to develop a portable computer analysis system for helicopter condition monitoring. This system will be based on the DEC LSI-11 microcomputer. A computer programmer will be required to assist in the development of applications and operating system software. He will join an established team of engineers who will be entirely responsible for all aspects of the system design. This work represents a unique and rewarding opportunity to become involved in the production of software to control some of the latest developments in electronic hardware. Applicants should have experience in programming a PDP-11 assembler and an understanding of DEC operating systems would be advantageous. The appointment is initially for 3 years.

Applications, giving a curriculum vitae and the names of three referees should be sent to D. A. S. Copland, The University, Southampton SO9 5NH, quoting reference 151/A as soon as possible.

Computer Programmers
Saudi Arabia

A challenging assignment worth at least £19000 tax free per two year contract

The operation and maintenance of a sophisticated air traffic control programme is an important aspect of Lockheed Aircraft International's activities in Saudi Arabia, and the challenge offered to experienced personnel is, therefore, considerable.

Additional programmers are required to carry out a wide range of work relating to computerised support systems. The essential requirements are sound experience of LEC or IBM System 3, plus RPG II together with some knowledge of FORTRAN, COBOL and/or machine language. Business experience, ideally in inventory control, personnel records, flow charts, etc. would also be advantageous.

With the recent increases in salaries and benefits, Lockheed are now able to offer a salary of at least £7341 per annum tax free for a two year contract plus –

* A bonus payment of £500 every six months culminating in an end of contract bonus of £2500, totalling £4000.
* Cost of living allowance of approximately £200 pa., paid monthly.
* Three paid leave periods with three free flights home to the UK annually.
* Free food, laundry and bachelor accommodation.
* Free medical care and life insurance.
* Good recreational facilities.

There are excellent prospects of employment beyond the contract period, and the positions could be accompanied, although terms and conditions will vary from the above.

IAL — Lockheed International

Write or telephone for an application form, quoting Ref. 406 to IAL Limited, Aeradio House, Hayes Road, Southall, Middlesex. Telephone: 01-574 5000.

COMPUTER PROGRAMMERS
COME LIVE IN '79
THIS ISN'T ANOTHER BORING JOB

*Real Challenge for a Senior Programmer having 5 years' COBOL experience and some Assembler.

*Coming Live in March '79 is this IBM 370 configuration running under DOS/VS with POWER/VS and CICS.

*Initiative and Flexibility are required within the department and for writing the more complex programs, testing programs, and solving technical problems.

*Motivation and Supervision of the team are part of your job so no ordinary person will suffice.

*Chance to Escape from Central London and relocate, with generous assistance, to Hertfordshire and work with easy access to the M1.

*Liaison with Product Group Managers is another essential ingredient so a good communicator is sought.

*Salary to £7,000, pension scheme, life assurance, loan scheme, subsidised canteen and many other benefits could be your package if you phone Mrs. A. Jones on 01-404 5701. Cripps, Sears and Associates, Personnel Consultants.

Cripps, Sears

ASSEMBLER PROGRAMMER

If you are experienced in mini (or micro) computer systems, we offer you the opportunity of joining a small but expanding Systems House based in Streatham.

You will work on a variety of commercial applications for INTERDATA & MAEL hardware, with other equipment currently being investigated. A knowledge of high level languages would be an advantage but not essential.

We offer an excellent salary + bonuses + car allowance, together with the prospect of a rewarding and exciting career.

Contact: Paul Turner, of DISCAS BUSINESS COMPUTERS on 677 3611

SENIOR SYSTEMS ANALYST
S.W. HERTS
£5,700 to £6,850
plus £200 London Weighting
plus 50p per day Luncheon Vouchers

A Senior Systems Analyst is required at our Watford office to design and implement systems for our medium sized ICL 1900 computer with local communications equipment (to be enhanced in the future with connections to our regional offices).

Other current projects include implementing IDMS database.

Applicants should have at least two years' systems experience, and experience of supervising projects and/or staff.

Contact Mrs D. L. Gyford, Personnel Department, for an application form, at

ITB
Engineering Industry Training Board
41 Clarendon Road
Watford Herts. WD1 1HS
Telephone: Watford 44322

GUILDFORD	SNR SYST ANALYST	£6,500
SURREY	RPG 11 PROGRAMMERS	To £6,500
UXBRIDGE	IBM SYST ANALYST	C£6,500
LONDON W.1	ANS COBOL PROGRAMMER	To £6,000
BRACKNELL	COBOL ANAL/PROGRAMMERS	To £6,000
LONDON E.1	SYST ANALYST 2-3 YEARS	C£6,000
LONDON S.W.18	SYST ANALYST PLAN/COBOL	Neg
GUILDFORD	SENIOR PROG COBOL/ASSEM	C£5,500
LONDON W.1.	RPG 11 PROGRAMMERS	To £5,500
REDHILL	PL/1 PROGRAMMERS 2 YEARS	To £5,000
LONDON E.1.	PL/1 PROGRAMMERS 2 YEARS	To £5,000
GREENFORD	RPG 11 PROGRAMMER	C£5,000
LEATHERHEAD	ICL SHIFT LEADER	Neg
GREENFORD	IBM SYST 3 SHIFT LEADER	C£4,500
BRACKNELL	JUNIOR PROG COBOL	To £4,500
LONDON E.C.3	IBM OPERATOR	£4,300

Please telephone or call in for details of these and other vacancies and an Application Form.

AMES PERSONNEL

Employment Agency Suite 14, Dryden Chambers, 119 Oxford Street, London W1R 1PA. Tel: 01-434 1106

A REAL CAREER PATH TO SUCCESS FOR ANALYSTS AND PROGRAMMERS

Leeds £4000 - 6000

We know it is unusual to talk about real career paths for systems analysts and programmers in an age where a shortage of numbers of skilled people means that emphasis is often placed on just getting the job done.

But our client, a well-known British group, wishes to recruit additional systems analysts and programmers to be based at its head office in Leeds and places **emphasis** on ensuring that there is a clear career path for all successful candidates.

The following should interest all career minded systems analysts and programmers:-

NEW INSTALLATION **REAL-TIME**
ON-LINE **DISTRIBUTED PROCESSING**

The work will be on the development of major NEW systems - How nice to be free from minor enhancements and maintenance work.

The opportunities cover a wide range of positions and our client is confident that there is a vacancy to suit all levels of experience from one years COBOL to three years systems analysis.

Generous salary package, and where appropriate, relocation expenses will be reimbursed.

Interested candidates should telephone or write in complete confidence with brief career details, quoting ref C/78081 to IVOR NORTON at the address below.

WE BELIEVE THESE TO BE SOME OF THE BEST CAREER OPPORTUNITIES IN THE NORTH OF ENGLAND OR FOR THAT MATTER IN THE COUNTRY AT THE PRESENT TIME.

DON'T DELAY - CONTACT US TODAY

Ivor Norton Management Services Ltd

Recruitment Consulting Division

P.O. Box 63, Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate 66628

Senior Computing Analyst

Test Engineering Computer Facility

Leyland Vehicles' Engineering Services Division requires a Senior Technical Computing Analyst for their test engineering computer facility. The Senior Analyst will be involved in the implementation of a new range of data processing computer facilities and will assist in providing the necessary technical support to end users, particularly in respect of software.

We would like to discuss this position with candidates with one to two years experience of technical computation in an engineering environment. Candidates must have a knowledge of FORTRAN, and preferably of computer graphics.

The position is located in an expanding area, and therefore the prospects are attractive. The post offers a competitive salary, participating in the Company car purchase scheme. Relocation expenses will be available where necessary.

Leyland is situated within easy reach of cities, coast and countryside.

To apply please telephone for an application form, or write giving full details of age, qualifications and current salary to

Leyland Vehicles

Alec Luhaste, Staff Planning Officer, Group Staffs Personnel, Leyland Vehicles Limited, Leyland, Lancs PR5 1SN. Tel: Leyland 33675.

B. H. BRACKWELL LTD.

require a

COMPUTER OPERATOR

We are a large mail-order book selling company, many of our systems are well computerised with more than sixty VDUs in operation.

Owing to the implementation of three shift working, applications are invited for the post of computer operator.

Applicants should have six to twelve months' experience on an ICL 1900 mainframe, preferably with knowledge of George 2.

★ Salary £3460 to £4325 per annum which includes a shift premium
★ Good working conditions
★ Holiday arrangements honoured
★ Sports and Social CLub

Please contact: Penny Worner, B. H. Brackwell Ltd., Beaver House, Hythe Bridge Street, Oxford. Tel: Oxford 44944.

URGENT!
CONTRACT OPERATORS
and
DATA CONTROLLERS

George II + requirements immediately

'Ring DOUG at SPAN 01-235 3215

APPLICATIONS ARE INVITED FOR:

SPECIALISTS IN THE FIELD OF:

i) PROJECT LEADERS
ii) PROGRAMMERS
iii) DATA ENTRY PERSONNEL

Applicants should be professionals in Data Processing and Computer Sciences. Experience for the first two positions should include:

I Accessing of Industrial Data Banks
I Applications in Econometric Model Building, Forecasting, Operations Research, Management Sciences
I Proficiency in Higher and Lower Level Programming Languages

The Gulf Organisation for Industrial Consulting (GOIC) was established by seven Arab Gulf States: United Arab Emirates, Iraq, Saudi Arabia, Oman, Qatar, Kuwait and Bahrain.

The objective of the organisation is to achieve industrial co-operation and co-ordination among the member states.

Minimum regular contract for two years, renewable. Excellent benefits (competitive salaries, free air conditioned and furnished housing, vacation, vacation travel reimbursement) and a challenging working environment.

Apply with complete résumé on academic and professional background with cover letter stating career goals and objectives to:

PERSONNEL MANAGER
GULF ORGANISATION FOR INDUSTRIAL CONSULTING
POST BOX 5114 DOHA - QATAR

DATA MANAGEMENT

DAVY-LOEWY based in Sheffield and a member of DAVY INTERNATIONAL designs, manufactures, supplies, installs and commissions rolling mills, hydraulic presses, process lines, associated ancillary equipment and control systems, for steel, aluminium and other non-ferrous metal works plant and manufactures custom built plant to other industries.

The Company is currently engaged in an exciting and challenging development of its management information systems using online database techniques. The information service function is being expanded and now requires a data co-ordinator responsible for the information services manager for all activities relating to the organisation and control of company data.

The Data Co-ordinator will be required to build up a central authority for data that will take part in the logical development of the database. He / she will carry out all database administrations required from the user end. In addition the person appointed will be the link between the company's database and related activities at Davy Computing Limited and other group companies.

Candidates, either male or female should be over 26 years of age and preferably be graduates of a relevant discipline, and must have several years experience in data processing and computer systems analysis. The successful candidate will have the ability and personality to assimilate the information requirement of users at all levels and to define a logical database structure which models the operation of the company.

This is a senior appointment and salary offered will be determined by the degree of relevant experience / expertise possessed by the successful candidate. A comprehensive employment package is provided which includes relocation assistance where necessary.

If you wish to discuss the post, telephone or otherwise write for an application form to

M. J. Kinneavy
Staff Personnel Officer
DAVY-LOEWY LIMITED
Prince of Wales Road
Sheffield S9 4EX
Telephone Sheffield 0742-449971

Davy

Opportunities for a Computer Career

At present we have a large ICL 1904A Computer running under GEORGE II and working a three-shift system. This computer will be replaced by an ICL 2960 in January, 1979.

We have vacancies for an . . .

Operator

. . . with a minimum of six months' experience who is looking for an increased responsibility and has the drive and ability eventually to become a shift leader.

Trainee

. . . to join our Computer Services and embark on a computer career through a planned career development scheme. The scheme gives entrants a thorough practical grounding in the operations of a large busy Computer Unit with a view to their moving on to programming in two years' time. Applicants will be aged 18 or over, have at least one 'A' level (or equivalent) and also 'O' levels (or equivalent) in English and Mathematics.

Computer Control Clerk

. . . to be responsible for the flow and control of work through the computer area, the making up of computer runs, the checking of printed output and dealing with queries from user departments. A knowledge of computer principles would be advantageous coupled with a methodical and accurate approach to work involving meeting deadlines.

We offer

* a good starting salary
* a friendly working atmosphere
* Subsidised cafeteria
* thriving sports and social club on the premises
* for staff employed on shift work subsidised meals, day, evening and night and free transport home outside normal working hours.

For further details and application form please contact;

MMB

Personnel Manager
Milk Marketing Board
Thames Ditton
Surrey KT7 0EL
Tel: 01-398 4101, ext. 381.

COMPUTER PERSONNEL APPOINTMENTS LTD.
Career Specialists and Consultants for
D.P. MANAGERS, SYSTEMS ANALYSTS, PROGRAMMERS AND OPERATORS
Midlands, Northern Counties and Scotland
For application forms apply to
65 New Street, Birmingham B2 4DU. 021-643 0951
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Programmers & Analysts

Bring us your commercial experience and discover a world of difference in your career with Digital.

There's a world of difference in a progressive career with Digital. We're a young, energetic and very successful company. We revolutionised the computer industry by inventing the mini-computer and opening up rich new markets in international commerce. We're the world's leading manufacturer in our field with one of the most penetrating marketing functions in the industry.

The rich mix of personalities we employ creates an atmosphere that is not only highly professional but stimulating to work in and that creates impressive results. As part of our growth we have now launched an exciting phase of development at our North European Headquarters in Reading including the installation of two entirely new computerised operations centres.

We now wish to appoint additional PROGRAMMERS AND ANALYSTS who have around 3 years commercial programming experience including work on the implementation of major Administration, Marketing or Finance programmes, preferably utilising COBOL, BASIC+, RPG or FORTRAN.

By joining us now you will gain a uniquely wide experience within a very short time across the whole range of Digital hardware. It's the kind of concentrated, quality experience which will considerably improve your prospects both within the computer industry and more specifically within Digital. As a company which actively encourages the development of its staff and values individual contribution highly, your promotion prospects are well above average.

Naturally, we offer highly attractive salaries plus a comprehensive range of fringe benefits including an excellent staff restaurant and an active sports and social club. If you're the sort of professional who values individuality, wants your skills to be recognised and developed and thinks we sound like YOUR kind of company, discover the difference we can make to your career, by contacting Eric Montanios, Digital Equipment Co. Ltd., 2, Cheapside, Reading, Berks. Tel: Reading (0734) 583555. Quote ref. 431.

digital

BRITISH HOME STORES

Prova

OPERATIONS OPPORTUNITIES

British Home Stores have vacancies for experienced Computer Operations staff to join their installation in Central London. Existing hardware consists of a 1 megabyte 370/145 operating under DOS/VS, POWER/VS with a 3031 to be installed in 1979. An 8-hour 4-shift system will be in operation in this computer room where the following vacancies exist:

SHIFT LEADER from £5,800
SNR OPERATOR from £5,300

The environment is rapidly developing and excellent opportunities exist in their new OPERATIONS SUPPORT TEAM. This area requires people with a sound technical knowledge of DOS/VS, JCL and operating procedures to improve the operational efficiency of existing and new systems. These are the non-shift positions available

SNR OPERATIONS ANALYST to £6,000
OPERATIONS ANALYST to £5,000

In addition to the excellent salaries, B.H.S. offer substantial benefits including

* Free lunches
* 20% shopping discount
* Free life assurance
* Season-ticket Loan Scheme

To apply, please telephone LINDA BENSTED on 01-836 6775 or write to her enclosing details of your experience.

Computer Personnel International
A DIVISION OF COMPUTER SERVICES INTERNATIONAL
110 St Martin's Lane, London WC2N 4BH 01 836 6775
Computing Services Association

STRATHCLYDE REGIONAL COUNCIL

GLASGOW Sub-Region
ROADS DEPARTMENT

SENIOR ENGINEER (SYSTEMS)

Salary Scale — SO1 — £6348-£6867*

The Council has recently approved the establishment of a traffic surveillance and control system for the Glasgow Motorway/Expressway network, and it is expected that installation of the system will commence early in 1979. Research is also being carried out into methods of co-ordinating the existing motorway controls, area traffic control and other surface street signals. The project offers unique opportunities for a Systems Engineer with experience in computer-controlled systems, particularly in road traffic control. Applications for the above post are invited from Chartered Engineers although applications from non-chartered candidates with exceptional qualifications and experience will also be considered.

* This salary range is inclusive of supplement.

Application forms may be obtained from The Assistant Director of Manpower Services, 21 Gordon Street, Glasgow, G1 3PS (Tel. 041-221 4376) to whom completed forms, quoting Ref. G/317, should be returned by September 21, 1978.

R. M. D. McCulloch
Director of Manpower Services

Scientific Analyst/Programmer

London — up to £6168

We are seeking an experienced Analyst/Programmer for our Communications and Instrumentation Department. The requirements are:

* 2 years' experience of scientific or engineering computing
* knowledge of a high level language, preferably FORTRAN
* a degree or equivalent qualification

The computer system:

* UNIVAC 1106, operating under OS1100
* Interactive and batch terminal facilities.

Salary range £5289-£6168.

If this post interests you please ring David Pyatt on 01-831 6272 ext 4192 or write giving full details of age, experience, qualifications and current salary, quoting reference PS 616701(705)/CW, to the Senior Personnel Officer (Hinckley), British Gas, 59 Bryanston Street, London W1A 2AZ.

BRITISH GAS

INTERNATIONAL COMPUTER SALES & ENGINEERING

Leasco is Europe's leading computer leasing company specialising in medium and large scale IBM computers. Leasco has an unequalled record of almost 300 customers throughout Europe and is uniquely qualified to meet the ever-growing demand for cost effective IBM hardware. Our computer skills in hardware engineering and software are backed by financial expertise and the tremendous financial strength of a major worldwide corporation with assets of more than two billion dollars. We are planning a major expansion in our marketing and engineering services and need more people to augment our existing highly successful operation. All positions offer excellent salary and benefits. Opportunities for advancement are outstanding for the right people.

INTERNATIONAL SALES EXECUTIVE (REFERENCE S.1)

THE JOB This is a key position within the company reporting directly to the European General Manager. The successful applicant will be responsible for selling the company's services in a number of European countries where we do not have a permanent office. In addition it may be possible to make available an existing European territory depending on the nationality/language capabilities of the applicant. Travel throughout Europe will be necessary. Compensation will consist of high basic salary plus generous commission earnings on all contracts, plus usual benefits.

QUALIFICATIONS Previous outstanding sales record in computer or related equipment is essential as is a knowledge of IBM's 360/370 computers. Fluent English plus one or more other languages, an aptitude for finance and sound business judgement in addition to selling ability is necessary. Previous experience in overseas markets will be an advantage. Above all else the successful candidate must be self-motivating and capable of working with minimum supervision to the final closing of large contracts. This is a responsible, highly paid position for which only a dedicated highly professional marketing man should apply.

LOCATION Because of the international aspect of the job applicant's own preference can be taken into account. Leasco's offices in either Paris or Maidenhead will provide the back-up facilities for this post.

SALES ENGINEER (REFERENCE C.1)

THE JOB This is a truly outstanding opportunity for a high calibre IBM trained customer engineer who can provide evidence of business acumen to support his engineering skills. The man we are looking for will be a technical specialist within our engineering group who in addition to carrying out a variety of installations and engineering changes on behalf of the company will also be responsible for selling our engineering services to other computer lessors and end users. The position carries responsibility for ensuring the profitability and customer satisfaction for all work carried out. The Sales Engineer will report directly to the Manager of Leasco's engineering division. Travel throughout Europe is necessary. Compensation will be by a high basic salary and generous incentives for obtaining profitable additional business. A company car is provided.

QUALIFICATIONS We expect this man to bring an in-depth knowledge of IBM hardware and to be capable of carrying out complex engineering work personally as well as supervising others. In addition the Sales Engineer will be expected to negotiate contracts for engineering work, prepare written proposals and quotations. A positive attitude and a willingness to tackle a wide variety of tasks plus real job dedication is essential. A knowledge of German or French will be a real advantage.

LOCATION This position is based at Leasco's Engineering Centre in Slough.

SALES EXECUTIVES (REFERENCE S.2)

THE JOB The company is seeking additional Sales Executives to report to the country managers of several of its overseas subsidiaries. The country managers are responsible for providing leasing services and the buying and selling of computer equipment within their country. The Sales Executives assist in this function and upon successful completion of an initial training period will be granted a guaranteed sales territory within the country. Apart from looking after existing customers the job demands aggressive selling within a highly competitive environment. Success demands hard work, computer knowledge and ability to close contracts fast. The rewards for successful men are considerable. Compensation is by way of an attractive basic salary and high commission earnings plus usual benefits.

QUALIFICATIONS Previous successful record in computer sales is essential as is a knowledge of IBM hardware. We demand a high standard of salesmanship, dedication to the company's business and solid achievement. Generally it is the company's policy to employ nationals but we will give consideration to others where language ability and knowledge of local market conditions apply.

LOCATION Opportunities exist in the UK, France, Belgium, Holland, Germany, Switzerland, Italy and Spain.

SENIOR ENGINEERS (REFERENCE C.2)

THE JOB We require IBM trained Engineers to carry out the installation/de-installation of the company's 360/370/3000 series computers throughout Europe. Senior Engineers are responsible for the successful achievement of deadlines to meet the company's delivery promises. In addition we carry out major modifications, engineering changes, etc., to equipment to meet customers' requirements. Senior Engineers work largely unsupervised and are assisted by associate engineers for whose training they are also responsible. They represent our company at the customer's own site and we therefore expect a high standard of personal appearance as well as a responsible and pleasing manner. Compensation is by way of a high basic salary and a company car is provided.

QUALIFICATIONS IBM trained engineers only should apply. Experience on 360 as well as 370 is very desirable and previous experience in training others could be important. A positive helpful attitude is expected from our engineers who must be willing to travel throughout Europe and work irregular hours when necessary.

LOCATION These positions are based at Leasco's Engineering Centre in Slough.

Please reply to Director Personnel & Administration, LEASCO LTD., RELIANCE HOUSE, 150 BATH ROAD, MAIDENHEAD SL6 4LD. All replies will be treated in confidence. Please indicate by the above reference numbers for which position you are applying. Full career details and educational record together with a recent photograph should be enclosed with your reply which must be handwritten.

Westrail

Westrail provides the railway and ancillary road services to an area of one sixth of Australia or half of Western Australia. It serves nearly 90% of the State's population, has an annual income of about $150 million and, employing about 10,000 people, is one of the largest organisations in Western Australia. The Management Services Bureau provides Westrail management with the specialist services required to ensure acquisition and efficient utilisation of the resources necessary to achieve the organisation's objectives.

APPLICATION PROGRAMMERS

SALARY: $A9,735-$A14,276 (depending on qualifications and experience)

The Systems Division is an integral part of the Management Services Bureau. Programmers are required to work initially on the development of a Materials Supply System. This System will make intensive use of on-line data base facilities and will be implemented on Westrail's IBM 370 Model 138 computer. The development team is using CINCOM'S TOTAL data base and ENVIRON/1 data communication software for the project.

Qualifications and Experience

Applicants must have had a minimum of three years' experience for Senior Application Programmer, one year's experience for Application Programmer, in the practical use of COBOL. They must also have experience in a second programming language such as FORTRAN, PL/1, IBM Assembler or MARK IV.

Experience in writing high-level language programs for on-line computer systems is a highly desirable attribute.

The successful applicants will be appointed initially to Systems Division but depending on opportunities and preferences, they may be given the chance later to transfer to other Divisions in the Management Services Bureau. There they could work in areas such as Operations Research, Cost Research, Corporate Planning or Project Evaluation.

Applications

In writing, state age, qualifications and experience to
Manager, Systems Division
Management Services Bureau
Westrail Centre
GPO Box S1422
PERTH, WESTERN AUSTRALIA 6001

Western Australian Government Railways

STAFFORDSHIRE COUNTY COUNCIL

REAL TIME AND TECHNICAL SYSTEMS TECHNICIAN

(Computer Programmer)
Post No. 22.01..98

Technical Officers' Division Grade 1 to 5 — £1,656-£5,073 (includes unconsolidated supplement)

Commencing salary according to age and experience.

Applications are invited from men or women for the above post in the Highways Department Computer Section. The successful applicant will work on technical systems using the IBM 370/148. Assistance to end users will form a vital part of the work and there will be an opportunity for systems work. Terminal facilities are available to the IBM 370/148 for program development and running live jobs. Other equipment in use comprises a digital graph plotter and a programmable calculator.
Applicants should possess an appropriate qualification and have experience of FORTRAN. Experience in PL/1 and Assembler would be an advantage. Training will be given as necessary. Removal expenses and lodging allowance may be paid in approved cases. Application forms and further details obtainable from the County Surveyor, Tipping Street, Stafford ST16 2LP.
Closing date 22nd September, 1978.

DEPARTMENT OF TRANSPORT
NORTH WESTERN ROAD CONSTRUCTION UNIT

Applications are invited for the post of

STATISTICIAN/ PROGRAMMER

Grade AP 4/5 (£3933-£4761) plus supplement of £312 per annum on secondment from the Lancashire County Council in the Headquarters of the North Western Road Construction Unit at Preston.
The successful candidate will probably have a degree or equivalent qualification with a statistical and computing element and have experience of computer programming. The post provides great scope for personal initiative and innovation and is primarily concerned with the processing, storage and analysis of traffic data.
Conditions of service are those of the National Joint Council for Local Authorities Administrative, Professional, Technical and Clerical Services.
The normal hours of duty are 36¼ per week and the Unit operates a Flexible Working Hours scheme.
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North Western Road Construction Unit
Crystal House
Birley Street
PRESTON
Closing date is the 22nd September, 1978

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£10,000-£13,000

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Successful applicants will receive assistance towards fares and transportation of baggage to New Zealand.

For full details and application apply to the **Chief Migration Officer, New Zealand House, Haymarket, London SW1Y 4TQ. You should quote reference Imm 2/336/6.**
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According to experience

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Preference will be given to operators with experience on 1900 and/or 2900 systems on a shift system basis; although appropriate training will be given to operators with experience of non ICL mainframes.

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Application forms can be obtained from

The Personnel Department,
Eastern Gas,
Tower Point, Sydney Road,
Enfield, Middlesex.
Tel: 01-366 1234.

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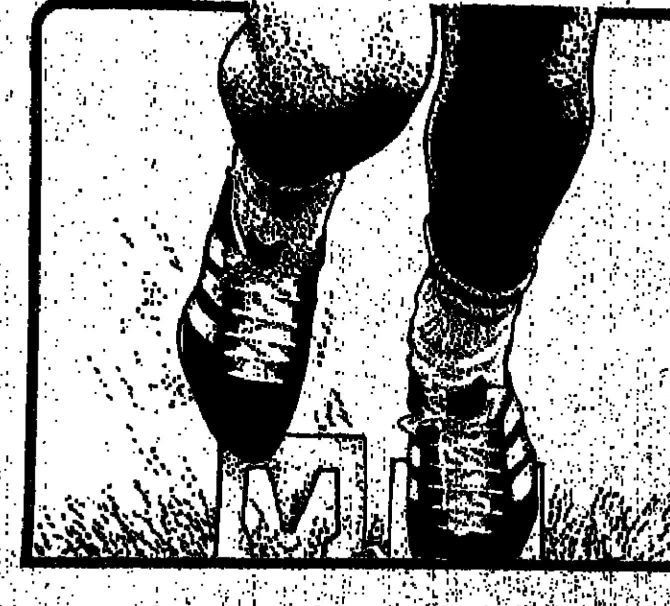
Ring Ian Carter for further details on 01-261 8016.



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CONDITIONS A two-year contract is envisaged with air passages for the successful candidate and family at the start and end of the contract. A minimum salary of £1?,000 per annum will be paid and other benefits include free fully furnished accommodation. Taxation in Hong Kong is a maximum of 15%.

APPLICATIONS Applicants should write to: The Manager, Technical Services Division, Standard Chartered Bank Ltd., 37 Gracechurch Street, London EC3V 0BX.
Interviews will be held in London during September.

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PROGRAMMER

£2823-£4632 (Ref. A/608/CW)
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A Trainee Computer Operator is required in the University Computer Unit. Previous experience is not required as training will be given. Applicants should be at least 18 years of age and have at least four "O" levels including Mathematics.

A three shift system is in operation and initial placement on the scale £1899-£2547 p.a. will depend on age and experience. With shift allowance salaries will be in the range £2242-£2949 per annum (under review).

Letters of application, stating date of birth, details of education and any relevant experience, together with the names of two referees, should be sent to Miss Doreen Watson, Administrative Assistant (Appointments), Northcote House, Exeter EX4 4QJ, by 9th September, 1978. Please quote reference No. 8632.

LANCASHIRE COUNTY COUNCIL
County Surveyor's Department

Applications are invited for the post of

COMPUTER PROGRAMMER

AP3 £3,420 to £3,834 plus supplement of £312 per annum. Applicants should hold a relevant University Degree or equivalent.

The County Council have considerable computing facilities including a new ICL 2970 Computer. The County Surveyor's Department and the Sub-Unit of the North Western Road Construction Unit operate an RJE terminal, slow speed terminals and a graph plotter.

In addition to the normal programming requirements the work includes close liaison with technical and non-technical staff in introducing and running programs.

Application forms and further details obtainable from:
The County Surveyor, Guild House, Cross Street, Preston, PR1 8RD (Preston 54733, Ext. 204), to whom they should be returned by the 15th September, 1978.
Please quote Reference 477.

Senior Software Engineer

West London c£7,500 p.a.

Our client is a successful operating division of a large British organisation which is a world leader in its field and has an impressive record of engineering achievements.

Due to its success in the field of minicomputer and microprocessor-based control systems, the division needs to expand its software capability by appointing a senior software designer to head up the development team. Responsibilities will embrace all software aspects of new development projects and the successful candidate will be expected to make a significant personal contribution to the projects.

Applicants (male and female) must have had previous experience of leading a software team involved in the development of minicomputer, multi-processor or microprocessor-based interactive or real-time systems. Experience of PDP 11-based equipment would be a distinct advantage.

The market for the division's products is world-wide and the position will entail some overseas travel, particularly within Europe, to support and promote new developments.

A salary which reflects the considerable importance of this position to the division's future will be offered and excellent fringe benefits include generous relocation assistance.

For further information, telephone Colin Cunningham on 01-568 4108 or write with career details to Mike Batsch, quoting ref. no. 131 at the address below:

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TRAINEE OPERATOR £3000-£3500

Moorgate

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Please contact Jenny Dalrymple-Hay on 01-493 2947, William Key & Partners, 4 Half Moon Street, London W1, or Moorgate. John Westwood, 01-606 9966, Ext. 371, or Amersham. Peter Davies, Little Chalfont 4466.

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For further details, please write or, better still, telephone, quoting reference 8362, to Richard Durvell at Astral Recruitment Associates, Astral House, 17-19 Maddox Street, London W1R 0EY. Telephone: 01-629 2356 (ansafone after 6 p.m.).

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SYSTEMS ANALYSTS	To £6,500+	CONSTRUCTION INDUSTRY	HERTS	MINIS/IBM	Analyst with 2 years+ experience required to work on a wide variety of interesting projects with DB/on-line applications.	35/4
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ANALYSTS	To £6,500+	MANUFACTURER	LONDON & EUROPE	MINIS	First class opportunities for DP professionals with financial systems and programming experience to work in the software development and installation of systems on clients' sites.	35/7
SCIENTIFIC ENGINEERING PROGRAMMERS	At Neg.	BUREAU/ CONSULTANCY	HOLLAND	MINIS	1 year+ contracts available to scientific/technical people with 3 years+ experience on preferably DG, HP or DEC machines to work in an engineering consultancy environment.	35/8
PROGRAMMERS & GRADUATES	To £5,500	ENGINEERING CONSULTANCY	SURREY	ANY	Excellent opportunities for people with some FORTRAN experience to develop engineering applications and software. Training facilities provided.	35/9
SYSTEMS ANALYSTS	c.£6,000+	ENGINEERING INDUSTRY	LONDON	ICL 1900	Unusual opportunities for analysts with 2 years+ experience to join a progressive organisation with challenging and unusual systems requirements.	35/10
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PROGRAMMERS & ANALYSTS	To £6,500 + Benefits	TRAVEL INDUSTRY	LONDON	IBM	Opportunities for COBOL/Assembler programmers and analysts with experience of financial systems to join this progressive organisation.	35/14
TECHNICAL SUPPORT STAFF	To £8,000+	MANUFACTURER	BERKS + TRAVEL	MINIS	Computer professionals with client liaison experience required to join this successful organisation to provide technical/software support.	35/15
GRAPHICS/ COMMUNICATIONS STAFF	c. 50,000 Guilders	SERVICE INDUSTRY	HOLLAND		People with engineering/graphics/CAD communication experience required for exciting development work based in Holland.	35/16
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JUNIOR & SENIOR PROGRAMMERS	To £6,000+	ELECTRONICS INDUSTRY	SURREY	ANY	Programmers urgently required with experience in Assembler, CORAL, COBOL, FORTRAN or ALGOL to work on advanced scientific and technical applications.	35/18
ANALYST/ PROGRAMMERS	To £7,000+	SERVICE ORGANISATION	LONDON	PDP 11	Excellent career prospects for analyst/programmers with 2 years+ experience of BASIC+ and RSTS to work on a wide variety of applications.	35/19
SYSTEMS ANALYSTS	To £6,000	CHEMICAL/DISTRIBUTION INDUSTRY	W. LONDON	ANY	First class career opportunities for analysts with 6 months+ experience to develop commercial applications in a DB/TP environment.	35/20
PROGRAMMERS/ CONSULTANTS	To £9,000+	TECHNICAL CONSULTANCY	SURREY	MINIS/MICROS	This rapidly expanding consultancy requires staff at all levels to work on advanced software/technical applications in the area of communications. Real-time, process control and basic software.	35/21
ANALYSTS & PROGRAMMERS	c. £6,500+	SOFTWARE HOUSE	LONDON	ANY	Excellent career opportunities for ambitious analysts and programmers with minimum 1 year's commercial experience to join this well established organisation.	35/22
SCIENTIFIC PROGRAMMERS	To £6,500+	MANUFACTURING SERVICES	VARIOUS S.E. ENGLAND	MINIS	Several interesting posts available to experienced programmers with in-depth knowledge of scientific applications on mini-computers.	35/23

PT 7
The other terminal for IBM and ICL mainframes
FERRANTI

COMPUTER WEEKLY

NEWS IN BRIEF

GA minis for biggest bank

A MAJOR order for General Automation minicomputers is in the pipeline from Bank of America, the world's largest bank.

The applications handled by its teller terminal network are to be expanded, and the bank, which already has complexes of 20 GA 16/440 minis at both its main computer centres, in San Francisco and Los Angeles, wants to add two more modules at each centre. Each module consists of four GA 16/440 minicomputers.

Orders roll in

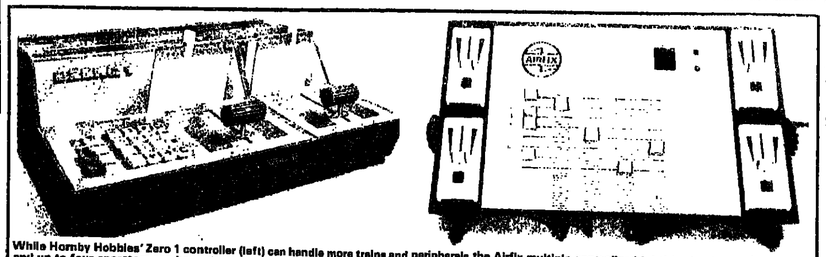
IN the two months since it announced its Olympic family of DEC LSI-11 based microcomputers, Gamma Computer Products, part of the Nottingham-based Gamma Associates systems group, has received orders for more than 25 systems, believed to be worth £300,000.

Direct access

A DATA management package known as HICS-AM has been introduced by Compelec for use on Altair disc-based computer systems. It supports any desired random or sequential record structure, and provides direct access to any record by data key.

Plessey groups

FOUR product groups have been formed within Plessey Microsystems in a reorganisation of the company. They are Memory Systems, managed by Ian Chapple; Optical Memories, managed by Peter Waterworth; Data Terminals, managed by Tony Gibson; and Special Processors and Applied Systems, for which a product manager has yet to be appointed.



While Hornby Hobbies' Zero 1 controller (left) can handle more trains and peripherals, the Airfix multiple controller (right) is simpler to understand and up to four operators can have their own control unit. On Zero 1, the operator has to remember what code has been assigned to each locomotive, signal, point, etc. However, Zero 1 has cost advantages over the Airfix system.

Micro future for model railway enthusiasts

HOT on the heels of Hornby Hobbies, toy manufacturer Airfix unveiled a microprocessor-based control system for model railways at the European Festival of Model Railways, at Central Hall, Westminster, last week.

Like the Hornby Zero 1 system (CW, August 3) it operates on 20 volts AC and the microprocessor is clipped between the power pick-ups and the motor to convert the power back to 12 volts DC. Input is by two wires.

The system, named Airfix multiple controller, was developed by Teequipment Consultants of Nottingham. But a spokesman for the firm would not give details of the microprocessor used.

Roy Palmer, Airfix commercial executive, said that the system could select up to four from 16 locomotives at a time and there was a separate hand controller for each loco.

The master controller assigned codes to the locos and control codes were sent along the rails to be interpreted by the chip.

A release date of summer 1979 was given and provisional costs are £6.50 for the chip, £9.50 for a hand controller and £45 for a master controller. This makes it more expensive than Zero 1, but the Airfix system is visually easier to understand.

Partner likely for Insac in US viewdata launch

A NATIONWIDE viewdata service in the US based on the Post Office Prestel software and GEC 4080 minicomputers is to be launched by Insac in the second half of next year. Although Insac has not ruled out the possibility of going it alone, it is more likely to launch the service in partnership with one of the US communications giants like AT&T, Western Union or RCA.

Insac has put in six months of intensive market research on the prospects for viewdata in the US, and is now so confident it is on to a winner that it has agreed to pay the Post Office several hundred thousand pounds for exclusive rights to the use of viewdata software and expertise in the US, and to pay a royalty on all viewdata revenues earned by Insac and its sub-licensees.

Insac believes that the Post Office has a substantial lead in viewdata expertise and that the GEC 4080 is uniquely appropriate to the application by reason of its hardwired operating system, which enables very short response times to be achieved.

Many of the US companies which have seen viewdata have apparently tried to develop their own versions on other minis, but found response times to be unacceptably long.

Software enabling Data General minis to be used as the basis of small-scale viewdata systems has been developed by GEC (CW, August 17), but this is aimed for a small number of users and would not be suitable for a national system.

Although in the UK viewdata was developed primarily as a home information system, in the US the first target market will be entirely business, which means that there will be no question of adapting customers' TV sets. Specially designed viewdata terminals like the ones STC is developing in the UK will be offered with the service.

West Germany and Holland have now opted for the UK viewdata system for their own national markets, and agreement in principle has been reached in Hong Kong.

Free access to data row looms

CONTROVERSY over a US proposal to give free access to databases to developing countries is expected at an international conference opening in Torremolinos this week.

The French in particular regard the ostensibly charitable US offer as imperialistic, and resent the idea of the Third World being flooded with information which they, the French, might regard as untrue or invalid.

The conference, organised by the Intergovernmental Bureau for Informatics, is basically about the transfer of computer technology to developing countries (CW, July 13). About 100 countries are sending representatives to the conference, among them at least 20 government ministers. The developed countries are all expected to put forward proposals as to how they can each help the Third World.

The US proposal, put forward some time ago, was to provide developing countries with free access to many of the online databases now available in the US, particularly those to do with earth resources, economics planning, and so forth, all important for economic development.

The French are worried that if countries receive most of their information from the US, this will lead to US domination in several ways. They are particularly concerned about information on current affairs and history, which can look very different from a French point of view than from an American.

Among the UK delegation will be Reay Atkinson, who is shortly to join DoI, Alan Benjamin of the CSA, Peter Hall of ICL, and Eric Howe of the NCC.

It is thought that the UK will offer education and training as the best contribution it can make to the combined offerings to the Third World.

Jewellers' order

BIRMINGHAM jewellers W. Weston and Son, one of the largest independent manufacturers of rings in UK, has replaced its manual accounting system with a £7,000 Philips Data System P310 computer to meet an increase in the volume of customer accounts.

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BTI 5000 processor extends O capability

A NEW processor, the BTI designed and built by the pany and capable of running the existing BTI 4000 softw has been introduced by Timesharing of Slough.

The new machine emu the instruction set of Hewlett-Packard 21MX which was used in the 4000 has been designed to extend optimise the capabilities of operating system. New facil include additional string dling.

One of the key features of proprietary time shar operating system is isolation one set of user programs fro other users, so that when example, the machine operated in a bureau envi ment, even the operator of hardware cannot get at user's source code.

Up to 32 ports are available the machine, and the slave time-slice allocated to each one second.

Programming is in Basic the Basic interpreter is clai to have been enhanced for b ness applications.

The standard configura consists of the CPU, disc troller, one 30 Mbyte drive, tridge controller with one Megabyte cartridge tape d for archiving, communicati processor with eight ports power supply, and costs $38,

Typical of the OEM custom Basic Timesharing is seeking Kalamazoo, which wants t the new machines.

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